
NHDES Wetlands Permit Application
NHDOT Project 16154
Bridges 127/099 and 124/096

Rehabilitation of I-93 Bridges over Salmon Brook

Sanbornton, New Hampshire

PREPARED FOR

New Hampshire Department of Transportation
PO Box 483, 7 Hazen Drive
Concord, NH 03302-0483
603.271.3734

PREPARED BY

VHB
2 Bedford Farms Drive Suite 200
Bedford, NH 03110
603.391.3900

June 2017

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NHDES Wetlands Permit Application Form





WETLANDS PERMIT APPLICATION

Land Resources Management

Wetlands Bureau

Check the status of your application: www.des.nh.gov/onestop



RSA/Rule: RSA 482-A/ Env-Wt 100-900

Administrative Use Only	Administrative Use Only	Administrative Use Only	File No.:
			Check No.:
			Amount:
			Initials:

1. REVIEW TIME:

Indicate your Review Time below. Refer to Guidance Document A for instructions.

☒ Standard Review (Minimum, Minor or Major Impact)

☐ Expedited Review (Minimum Impact only)

2. PROJECT LOCATION:

Separate applications must be filed with each municipality that jurisdictional impacts will occur in.

ADDRESS: **I-93 between mile markers 62 to 62.4 north and southbound**

TOWN/CITY: **Sanbornton**

TAX MAP: **N/A**

BLOCK: **N/A**

LOT: **N/A**

UNIT: **N/A**

USGS TOPO MAP WATERBODY NAME: **Salmon Brook**

☐ NA

STREAM WATERSHED SIZE: **11,500 acres**

☐ NA

LOCATION COORDINATES (If known): **43° 31' 18.8" N 71° 36' 45.5" W**

☒ Latitude/Longitude ☐ UTM ☐ State Plane

3. PROJECT DESCRIPTION:

Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

The NH Department of Transportation (NHDOT) proposes to repair NHDOT Bridges #127/099 and #124/096 which carry I-93 (Interstate Highway) northbound and southbound over Salmon Brook in the Town of Sanbornton. The repairs along the northbound bridge include full-depth concrete reconstruction along the center joint of the roof slab, grouting two wingwall joints, and patching and crack-filling areas along the roof slab and walls. The southbound bridge includes repairs in localized areas of spalled and delaminated concrete on the roof slab and southeast wingwall. The project is expected to improve the sufficiency rating of the northbound bridge and to resolve deficiencies found in the southbound bridge. To complete the project, NHDOT proposes temporary bed impacts of approximately 997 sq. ft./170 In. ft., temporary bank impacts of approximately 610 sq. ft./80 In. ft., and 8 sq. ft. of scrub-shrub/emergent wetland impact to install ladders and scaffolding within Salmon Brook in order to access the underside of Bridge #124/096 and the installation of cofferdams at Bridge #127/099. No permanent dredge and fill impacts are proposed for the bridge rehabilitation work.

4. SHORELINE FRONTAGE

NA ☒ This lot has no shoreline frontage.

SHORELINE FRONTAGE: **N/A**

Shoreline frontage is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line.

5. RELATED PERMITS, ENFORCEMENT, EMERGENCY AUTHORIZATION, SHORELAND, ALTERATION OF TERRAIN, ETC.

N/A

6. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:

See the Instructions & Required Attachments document for instructions to complete a & b below.

a. Natural Heritage Bureau File ID: NHB **17 - 0195**

b. ☐ [Designated River](#) the project is in ¼ miles of: _____; and

date a copy of the application was sent to the [Local River Management Advisory Committee](#): Month: ____ Day: ____ Year: ____

☒ NA

shoreland@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

www.des.nh.gov


7. APPLICANT INFORMATION (Desired permit holder)			
LAST NAME, FIRST NAME, M.I.: Robert Landry, PE			
TRUST / COMPANY NAME: New Hampshire Department of Transportation		MAILING ADDRESS: PO Box 483, 7 Hazen Drive	
TOWN/CITY: Concord		STATE: NH	ZIP CODE: 03302-0483
EMAIL or FAX: rlandry@dot.state.nh.us		PHONE: (603) 271-2731	
ELECTRONIC COMMUNICATION: By initialing here: _____, I hereby authorize NHDES to communicate all matters relative to this application electronically			
8. PROPERTY OWNER INFORMATION (If different than applicant)			
LAST NAME, FIRST NAME, M.I.:			
TRUST / COMPANY NAME:		MAILING ADDRESS:	
TOWN/CITY:		STATE:	ZIP CODE:
EMAIL or FAX:		PHONE:	
ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically			
9. AUTHORIZED AGENT INFORMATION			
LAST NAME, FIRST NAME, M.I.: Peter Walker		COMPANY NAME: VHB	
MAILING ADDRESS: 2 Bedford Farms Drive, Suite 200			
TOWN/CITY: Bedford		STATE: NH	ZIP CODE: 03110-6532
EMAIL or FAX: pwalker@vhb.com		PHONE: (603) 391-3900	
ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically			
10. PROPERTY OWNER SIGNATURE:			
See the Instructions & Required Attachments document for clarification of the below statements			
By signing the application, I am certifying that:			
<ol style="list-style-type: none"> I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application. I have reviewed and submitted information & attachments outlined in the Instructions and Required Attachment document. All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900. I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type. I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative. Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47. I have submitted a Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to identify the presence of historical/ archeological resources while coordinating with the lead federal agency for NHPA 106 compliance. I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project. I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate. I understand that the willful submission of falsified or misrepresented information to the New Hampshire Department of Environmental Services is a criminal act, which may result in legal action. I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining. The mailing addresses I have provided are up to date and appropriate for receipt of NHDES correspondence. NHDES will not forward returned mail. 			
 Property Owner Signature		Print name legibly	/ / Date

MUNICIPAL SIGNATURES

11. CONSERVATION COMMISSION SIGNATURE

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.


	Print name legibly	Date
--	--------------------	------

DIRECTIONS FOR CONSERVATION COMMISSION

1. Expedited review ONLY requires that the conservation commission's signature is obtained in the space above.
2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.
3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will be reviewed in the standard review time frame.

12. TOWN / CITY CLERK SIGNATURE

As required by Chapter 482-A:3 (amended 2014), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.

	Print name legibly	Town/City	Date
Town/City Clerk Signature			

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will NOT receive the expedited review time.
2. IMMEDIATELY sign the original application form and four copies in the signature space provided above;
3. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
4. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:

1. Submit the single, original permit application form bearing the signature of the Town/ City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery.

13. IMPACT AREA:

For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact

Permanent: impacts that will remain after the project is complete.

Temporary: impacts not intended to remain (and will be restored to pre-construction conditions) after the project is complete.

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.	TEMPORARY Sq. Ft. / Lin. Ft.
Forested wetland	ATF	ATF
Scrub-shrub wetland	ATF	8 ATF
Emergent wetland	ATF	ATF
Wet meadow	ATF	ATF
Intermittent stream	ATF	ATF
Perennial Stream / River	/ ATF	997 / 170 ATF
Lake / Pond	/ ATF	/ ATF
Bank - Intermittent stream	/ ATF	/ ATF
Bank - Perennial stream / River	/ ATF	610 / 80 ATF
Bank - Lake / Pond	/ ATF	/ ATF
Tidal water	/ ATF	/ ATF
Salt marsh	ATF	ATF
Sand dune	ATF	ATF
Prime wetland	ATF	ATF
Prime wetland buffer	ATF	ATF
Undeveloped Tidal Buffer Zone (TBZ)	ATF	ATF
Previously-developed upland in TBZ	ATF	ATF
Docking - Lake / Pond	ATF	ATF
Docking - River	ATF	ATF
Docking - Tidal Water	ATF	ATF
TOTAL	/	1,615 / 250

14. APPLICATION FEE: See the Instructions & Required Attachments document for further instruction

☐ Minimum Impact Fee: Flat fee of \$ 200

☒ Minor or Major Impact Fee: Calculate using the below table below

Permanent and Temporary (non-docking)	<u>1,615</u> sq. ft.	X \$0.20 =	<u>\$ 323.00</u>
Temporary (seasonal) docking structure:	<u>0</u> sq. ft.	X \$1.00 =	<u>\$ 0</u>
Permanent docking structure:	<u>0</u> sq. ft.	X \$2.00 =	<u>\$ 0</u>
Projects proposing shoreline structures (including docks) add \$200 =			<u>\$ 0</u>
Total =			<u>\$ 323.00</u>
The Application Fee is the above calculated Total or \$200, whichever is greater =			<u>\$ 323.00</u>

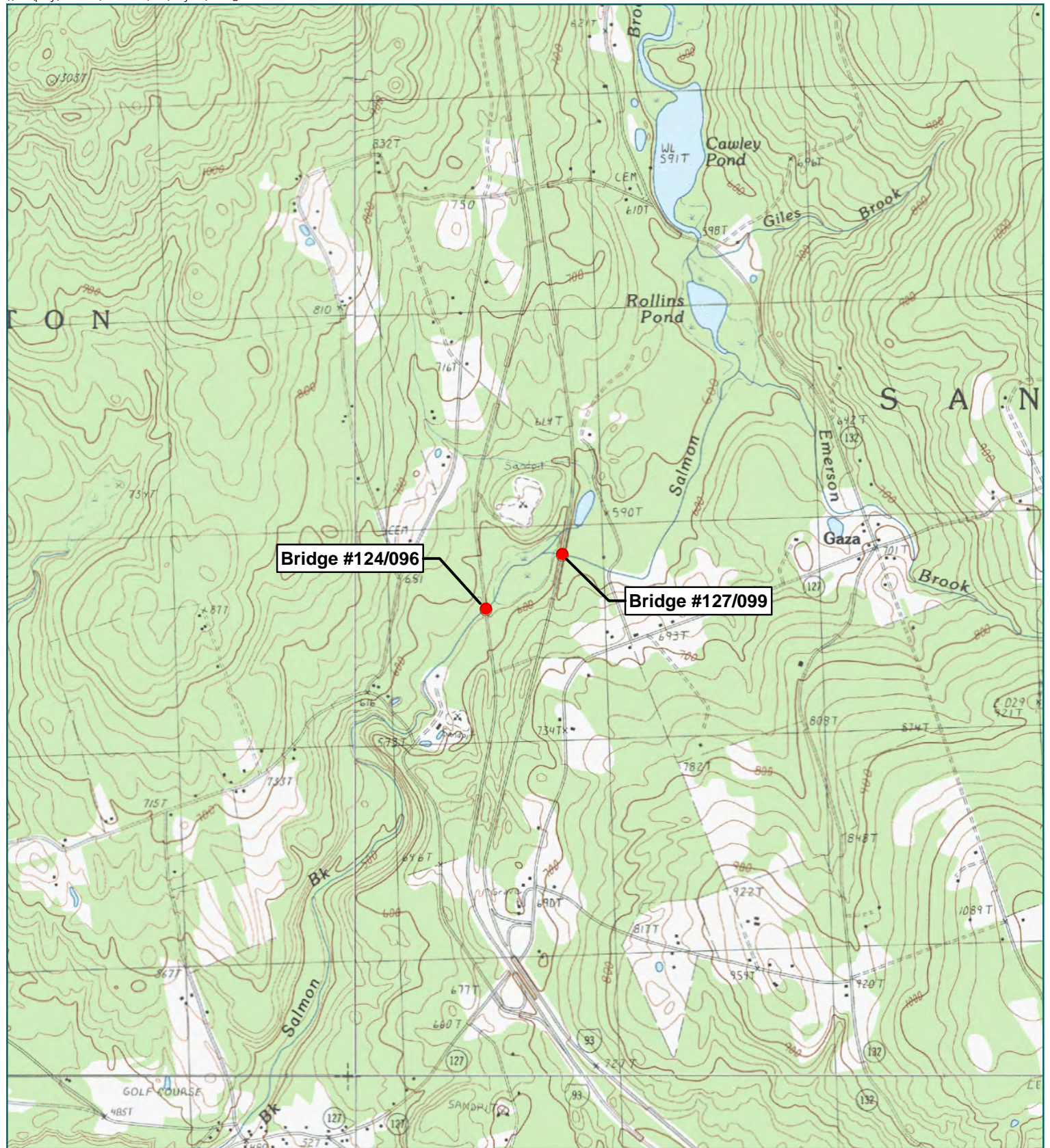
shoreland@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

www.des.nh.gov

USGS Location Map





● Project Location

1:24,000 scale



USGS Project Location Map
Bridge 127/099 & 124/096
I-93 NB and SB over Salmon Brook
Sanbornton, New Hampshire

Wetlands Permit Application – Attachment A





WETLANDS PERMIT APPLICATION – ATTACHMENT A MINOR AND MAJOR - 20 QUESTIONS

Land Resources Management Wetlands Bureau

Check the Status of your application: www.des.nh.gov/onestop



RSA/ Rule: RSA 482-A, Env-Wt 100-900

Env-Wt 302.04 Requirements for Application Evaluation - For any major or minor project, the applicant shall demonstrate by plan and example that the following factors have been considered in the project's design in assessing the impact of the proposed project to areas and environments under the department's jurisdiction. Respond with statements demonstrating:

1. The need for the proposed impact.

Upon inspection, the NHDOT Bridges #127/099 and #124/096 along I-93 (Interstate Highway) over Salmon Brook in Sanbornton, NH were found to be in need of repairs.

The March 2016 bridge inspection report for Bridge #127/099 indicates a Federal Sufficiency Rating of 58% with a status of "structurally deficient." The bridge was added to the NHDOT Red List in 2001 based on its poor condition. After further inspection by VHB on October 8, 2015, the roof slab of the bridge was found to be in poor condition, the culvert walls in satisfactory condition, and the wingwalls in satisfactory condition.

Overall, Bridge #124/096 is in good condition. The bridge is not on the NHDOT Red List, and the NHDOT Bridge Inspection Report from July 2014 gave the bridge a sufficiency rating of 85.9% and a status of "Not Deficient." An additional inspection of the bridge was conducted by VHB on October 8, 2015 and overall the bridge was found to be in satisfactory condition. However, several areas of deficiencies were found during the VHB inspection including minor areas of deterioration under the east and west bridge facia's and along the center joint of the roof slab.

Once completed, the project is expected to improve the sufficiency rating of the northbound bridge and to resolve deficiencies found in the southbound bridge. The proposed work for bridge rehabilitation is shown in the Wetland Impact Plans in **Appendix Q**.

2. That the alternative proposed by the applicant is the one with the least impact to wetlands or surface waters on site.

The proposed work for Bridge #127/099 includes concrete reconstruction along the joint of the roof slab, grouting two wingwall joints, and patching and crack-filling areas along the roof slab and walls. The proposed project also includes the repair of spalled and delaminated concrete on the roof slab and southeast wingwall of Bridge #124/096. These repairs are surficial and limited to the bridge structures themselves. The only wetland impacts proposed are temporary impacts associated with the installation of temporary cofferdams and placement of ladders and/or temporary scaffolding in order to gain access to the underside of the bridge structures where repairs are needed.

Replacement of the two bridges were not considered since the proposed project involves only minor rehabilitation, and since bridge replacement would be a significantly greater cost and would result in significantly greater temporary and permanent wetland impacts.

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3. The type and classification of the wetlands involved.

Temporary impacts to the bed and banks of Salmon Brook will occur as a result of the proposed work. Additionally, only minor temporary impacts are proposed to scrub-shrub/emergent wetland located on the northern side of Salmon Brook west of Bridge #127/099 (8 sq. ft.). In addition to the wetlands proposed to be impacted, delineated wetlands within close proximity to the bridges are also described below for context.

Salmon Brook is classified as Riverine, Lower Perennial, Unconsolidated Bottom, Cobble-Gravel/Sand (R2UB1/2). The brook at the Bridge #127/099 crossing was an average of 50 feet wide upstream and 48 feet wide downstream. Only low bank erosion was observed within the vicinity of Bridge #127/099, and wetlands line the banks of the brook to the east and west of this bridge structure. The southern bank of Salmon Brook to the east of Bridge #124/096 is characterized by relatively steep vegetative slopes with some erosion (undercutting) present. Slopes along the northern bank of Salmon Brook to the east of the bridge, as well as the northern and southern banks along the western side of the bridge, appeared to be stable as they are more gradual and terraced. The brook at the Bridge #124/096 crossing was an average of 26 feet wide upstream and 43 feet wide downstream.

Wetland delineated along the northern side of the brook to the east of Bridge #127/099 is classified as Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded/Saturated (PSS1E). An intermittent stream, ranging from three to six feet wide, flows out of a pond located outside of the project area to the north and traverses through the scrub-shrub wetland before outletting to Salmon Brook. Delineated wetland to the south of Salmon Brook and east of Bridge #127/099 is classified as Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded/Saturated (PFO1E).

Similar to the east of the bridge crossing, a large wetland complex draining to Salmon Brook was delineated along the northern and southern banks of the brook to the west of Bridge #127/099. Delineated wetland bordering the north side of Salmon Brook west of the bridge crossing, where temporary impacts are proposed, is classified as a combination of Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, and Palustrine, Emergent, Persistent, Seasonally Flooded/Saturated (PSS/EM1E) wetland. A sinuous perennial tributary draining to Salmon Brook and bordered by wetlands is present to the north of Salmon Brook outside of the study limits. This feature was not flagged. Delineated wetland bordering the south side of Salmon Brook to the west of the bridge crossing is classified as PSS1E wetland.

No wetlands were identified bordering Salmon Brook to the east of Bridge #124/096. An intermittent stream draining to Salmon Brook was delineated along the northern side of Salmon Brook to the west of Bridge #124/096. A small PFO1E wetland borders the northern portion of the intermittent stream. An additional PFO1E wetland draining to Salmon Brook was delineated along the southern side of Salmon Brook to the west of Bridge #124/096. The wetland extends south and west beyond the limits of the study area.

4. The relationship of the proposed wetlands to be impacted relative to nearby wetlands and surface waters.

Salmon Brook flows northeast to southwest and first enters Giles Pond before flowing into the Pemigewasset River. The I-93 bridges over Salmon Brook are approximately three miles northeast of where the brook enters the Pemigewasset River.

5. The rarity of the wetland, surface water, sand dunes, or tidal buffer zone area.

Salmon Brook flows northeast to southwest through residential and/or wooded areas. Cawley Pond and Rollins Pond are contributing waterbodies that are located approximately 1 mile and 1.3 miles (respectively) upstream from the I-93 bridges (refer to the USGS Project Location Map). As stated above, Salmon Brook flows into the Pemigewasset River located approximately three miles southwest of the I-93 bridges. Salmon Brook is not designated under the New Hampshire River Management and Protection Act and is not considered rare or unusual. No prime wetlands are located near the project area. The river exhibits common characteristics of a perennial stream in this area of New Hampshire.

6. The surface area of the wetlands that will be impacted.

Approximately 997 sq. ft./170 ln. ft. of temporary stream channel impact, 610 sq. ft./80 ln. ft. of temporary bank impact, and 8 sq. ft. of scrub-shrub/emergent wetland impact is proposed to access the underside of the bridge structures to complete the repairs. No permanent impacts are proposed. The proposed work for bridge rehabilitation is shown in the Wetland Impact Plans in **Appendix Q**.

7. The impact on plants, fish and wildlife including, but not limited to:

- a. Rare, special concern species;
- b. State and federally listed threatened and endangered species;
- c. Species at the extremities of their ranges;
- d. Migratory fish and wildlife;
- e. Exemplary natural communities identified by the DRED-NHB; and
- f. Vernal pools.

A search for the occurrence of rare plant, animal, or natural communities within the vicinity of the proposed project was completed using the NH Natural Heritage Bureau's (NHB) online Datacheck tool. A project report provided by the NHB, dated January 16, 2017, indicated that there are no recorded occurrences for sensitive species near the project area. No further consultation with NHB is required at this time. Refer to **Appendix E**, Endangered Species review, for the NHB report.

The proposed project was also reviewed for the presence of federally-listed or proposed, threatened, or endangered species, designated critical habitat or other natural resources of concern through the US Fish and Wildlife Services' Information Planning and Conservation (IPaC) System. Results dated January 16, 2017 indicated Northern Long-eared Bat (*Myotis septentrionalis*) (NLEB) may occur within the vicinity of the project (refer to **Appendix G**).

The proposed project will require the removal of select trees that are growing on or within close proximity to the bridges and may cause structural damage to the bridge if they remain. A desktop review of bridge inspection photos of the outside and underside of the bridges show no evidence of the presence of bats around or underneath the bridge (refer to **Appendix H**). Additionally, there are no known hibernacula within ¼ mile of the project site, nor are there any known maternal roost trees within 150 feet. Therefore, no impacts to the NLEB are anticipated as a result of the proposed project. In accordance with the procedures contained in the FHWA/FRA Range-Wide Programmatic Informal Consultation for Indiana Bat and NLEB, updated December 2016, a Project Submittal Form was completed to document this finding and submitted to the USFWS for concurrence on November 3, 2016 (refer to the Project Submittal Form and Bridge Assessment Form in **Appendix H**). A letter of concurrence from the USFWS was received by NHDOT on March 1, 2017 (refer to **Attachment H**). No further consultation with the USFWS is required for the proposed project. Though unlikely to be present within the project limits, the involved parties will promptly notify the USFWS Concord Field Office upon finding a dead, injured, or sick NLEB.

8. The impact of the proposed project on public commerce, navigation and recreation.

There will be no impacts to public commerce, navigation, or recreation. The proposed rehabilitation will improve the structural integrity of the northbound and southbound I-93 bridges over Salmon Brook, therefore improving the safety of vehicles traveling over the bridges. This portion of Salmon Brook is not a known recreational area for kayaking/canoeing or fishing, therefore no recreational impacts are expected during project construction.

<p>9. The extent to which a project interferes with the aesthetic interests of the general public. For example, where an applicant proposes the construction of a retaining wall on the bank of a lake, the applicant shall be required to indicate the type of material to be used and the effect of the construction of the wall on the view of other users of the lake.</p>
<p>There is only one residence located within the vicinity of Bridge #127/099 and none within view of Bridge #124/096. The views of Bridge #127/099 from the nearby residence are limited. The proposed project only involves surficial improvements to the bridge structures and therefore the appearance of the bridge structures will remain unchanged. The majority of the bridge rehabilitation work includes repairs along the undersides of the bridges as well as some repairs along the wingwalls.</p>
<p>10. The extent to which a project interferes with or obstructs public rights of passage or access. For example, where the applicant proposes to construct a dock in a narrow channel, the applicant shall be required to document the extent to which the dock would block or interfere with the passage through this area.</p>
<p>The proposed project would not significantly interfere with public rights of passage or access. Construction is proposed to last a total of six to eight weeks. During construction, a short-term lane closure and traffic shift is required along I-93 northbound to stabilize and repair the center top slab joint under the roadway. Traffic will be maintained during this phase of construction and will be shifted to the west with a reduced roadway width of about 27 feet (2'-12'-12'-1') to provide access for construction. Two lanes of traffic will be maintained throughout the duration of construction along I-93 southbound, with only a temporary shoulder closure.</p>
<p>11. The impact upon abutting owners pursuant to RSA 482-A:11, II. For example, if an applicant is proposing to rip-rap a stream, the applicant shall be required to document the effect of such work on upstream and downstream abutting properties.</p>
<p>There would be no impact upon abutting owners. All proposed work will occur within the NHDOT right-of-way (ROW) of I-93. The proposed repairs are surficial and will not alter the hydraulic opening of either bridge. There will be no changes in the way Salmon Brook currently flows under the bridges. Additionally, the contractor will be directed to contain concrete fragments and uncured concrete from impacting the water quality of the brook while repairs are being completed. All construction debris will be removed from the area upon completion of the repairs.</p>
<p>12. The benefit of a project to the health, safety, and well being of the general public.</p>
<p>The proposed project will improve the structural integrity of the bridges and therefore improve the safety of vehicles traveling across the I-93 bridges over Salmon Brook. Additionally, the rehabilitation will greatly extend the life of the bridges (approximately 20 years).</p>
<p>13. The impact of a proposed project on quantity or quality of surface and groundwater. For example, where an applicant proposes to fill wetlands the applicant shall be required to document the impact of the proposed fill on the amount of drainage entering the site versus the amount of drainage exiting the site and the difference in the quality of water entering and exiting the site.</p>
<p>No negative impacts on the quality and quantity of surface and ground water are anticipated. No changes in overland sheet flow will occur as a result of the repair work. Temporary water quality best management practices (BMPs) would be implemented to protect water quality during construction. Additionally, as previously mentioned, the contractor will be directed to contain concrete fragments and uncured concrete from impacting the brook while the repairs are being completed, in order to protect the water quality of the brook.</p>

14. The potential of a proposed project to cause or increase flooding, erosion, or sedimentation.
The proposed project is not anticipated to cause or increase flooding, erosion, or sedimentation. Only surface repairs to the bridge structures are proposed to occur, therefore the existing characteristics of Salmon Brook will remain unchanged. Temporary cofferdams will be installed for the proposed rehabilitation work at Bridge #127/099 (Northbound). The cofferdams will not cause any changes in flooding, erosion, or sedimentation within the brook, and a conveyance through Salmon Brook will be maintained throughout construction. See the Wetland Impact Plans in Appendix Q and the Access and Erosion Control Plans in Appendix R for more information.
15. The extent to which a project that is located in surface waters reflects or redirects current or wave energy which might cause damage or hazards.
The proposed project will not redirect current or wave energy. Erosion and turbidity control measures, including a cofferdam, will be installed as necessary before project work begins and will be used through the duration of the project in order to protect the water quality of Salmon Brook during the bridge repairs.
16. The cumulative impact that would result if all parties owning or abutting a portion of the affected wetland or wetland complex were also permitted alterations to the wetland proportional to the extent of their property rights. For example, an applicant who owns only a portion of a wetland shall document the applicant's percentage of ownership of that wetland and the percentage of that ownership that would be impacted.
No wetlands are proposed to be permanently impacted by the Project. Only minor temporary impacts (8 sq. ft.) are proposed within scrub-shrub/emergent wetlands north of Salmon Brook to the west of Bridge #127/099. Proposed work to the I-93 bridge structures over Salmon Brook involve surficial repairs that are minor in nature and will not alter the geomorphology or hydraulic capacity of Salmon Brook which could result in secondary impacts to properties located downstream.
17. The impact of the proposed project on the values and functions of the total wetland or wetland complex.
The proposed project is anticipated to have no measurable negative impacts on the functions and values of Salmon Brook or adjacent wetlands including fish, wildlife habitat, flood storage, sediment/toxicant retention, recreation, and/or aesthetic opportunities. The proposed rehabilitation of the I-93 bridges over Salmon Brook will improve the structural integrity of these bridges and the safety of vehicles traveling over the bridges.
18. The impact upon the value of the sites included in the latest published edition of the National Register of Natural Landmarks, or sites eligible for such publication.
There would be no impacts to Registered Landmarks as a result of the project as none are located within or near the project. The nearest Landmark to the project is the White Lake Pitch Pine forest located in Tamworth, approximately 40 miles away.

19. The impact upon the value of areas named in acts of Congress or presidential proclamations as national rivers, national wilderness areas, national lakeshores, and such areas as may be established under federal, state, or municipal laws for similar and related purposes such as estuarine and marine sanctuaries.

There would be no impact to these named national resources as none are located within or near the project. The nearest named national resource area to the project is the White Mountain National Forest, approximately 45 miles away.

20. The degree to which a project redirects water from one watershed to another.

No water will be redirected from one watershed to another as a result of the proposed bridge rehabilitation. Existing drainage patterns will be maintained.

Additional comments

Supplemental Narrative



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Supplemental Narrative

1.0 Introduction

On behalf of the New Hampshire Department of Transportation (“the Applicant” or NHDOT), this Wetlands Permit Application was prepared by VHB pursuant to the New Hampshire Revised Statutes Annotated (RSA) Chapter 482-A, Fill and Dredge in Wetlands, and Wetland Bureau Code of Administrative Rules, Chapters Env-Wt 100 through Env-Wt 900. Since this project involves the rehabilitation of a Tier 3 stream crossing, this project is being submitted as a Major Project according to Env-Wt 303.02(p).

2.0 Site Description and Existing Conditions

NHDOT Bridges #127/099 and #124/096 are located approximately 1.1 miles north of Exit 22 on I-93 (Interstate Highway). These bridges were constructed in 1962 and carry I-93 northbound and southbound over Salmon Brook. There is a wide span of 0.25 miles between I-93 northbound and I-93 southbound at the location of the bridges. Refer to the attached USGS Location Map for further information on the location of the bridges. Refer to the attached USGS Project Location Map and **Appendix K**, Representative Site Photos, for additional information about the site.

2.1 I-93 NB Bridge #127/099

The existing northbound bridge is a cast-in-place reinforced concrete box culvert with a 24 ft. clear span, and a 16 ft. vertical opening. The bridge is approximately 28 ft. long (parallel to I-93) and 113 ft. wide (perpendicular to I-93). The central 60 ft. includes two sections with thickened slabs and walls. The outer sections include a three-sided “u-section” where the top slab is day-lighted to the embankment slope with a headwall. There are four cantilever concrete wingwalls at each corner with varying heights. The wingwalls are flared at 45 degrees from the culvert. Existing plans indicate a permanent timber sheeting cutoff wall was constructed along the toe of the culvert and wingwall footings. The culvert supports up to 13 feet of embankment fill under the roadway.

The March 2016 NHDOT bridge inspection report for the northbound bridge indicates a Federal Sufficiency Rating of 58% with a status of “structurally deficient.” The bridge was added to the NHDOT Red List in 2001 based on its poor condition.

After further inspection by VHB on October 8, 2015, the roof slab of the bridge was found to be in poor condition, the culvert walls in satisfactory condition, and the wingwalls in satisfactory condition.

2.2 I-93 SB Bridge #124/096

The existing southbound bridge is a cast-in-place three-sided concrete frame with footings founded on bedrock. The bridge has a clear span of 24 ft. and a maximum vertical opening of 14.75 ft. constructed in 1962. Record plans indicate that the bridge is approximately 29.5 feet long (parallel to I-93) and 59.5 feet wide (skewed 20 degrees to I-93). The rail-to-rail width above the bridge is approximately 38 feet with about 4 feet of fill above the roof slab. The bridge consists of a variable height three-sided frame and flared wingwalls at each corner. Roof thickness varies from 1'-6" at the wingwalls to 1'-7" at midspan. The walls are a constant 1'-6" thick. The wingwalls are flared either 40 or 60 degrees from the culvert. The wingwalls are cast-in-place concrete with spread footings founded directly on bedrock.

Overall, the southbound bridge is in good condition. The bridge is not on the NHDOT Red List, and the NHDOT Bridge Inspection Report from July 2014 gave the bridge a sufficiency rating of 85.9% and a status of "not deficient." An additional inspection of the bridge was conducted by VHB on October 8, 2015 and overall the bridge was found to be in satisfactory condition. However, several areas of deficiencies were found during the VHB inspection including minor areas of deterioration under the east and west bridge fascia's and along the center joint of the roof slab.

3.0 Proposed Project Description

NHDOT proposes to repair Bridges #127/099 and #124/096 which carries I-93 northbound and southbound over Salmon Brook. The repairs are expected to improve the sufficiency rating of the northbound bridge and to resolve deficiencies found in the southbound bridge. The sufficiency rating determination of the northbound bridge will be made by NHDOT bridge inspections to be completed following the project. The estimated service life of these repairs is approximately 20 years.

Overall, the proposed project work includes the following:

- Bridge #127/099, I-93 Northbound:
 - Concrete reconstruction along the joint of the roof slab
 - Grouting two wingwall joints
 - Patching and crack-filling areas along the roof slab and walls
- Bridge #124/096, I-93 Southbound:
 - Repair of spalled and delaminated concrete on the roof slab and southeast wingwall

Personnel will access Bridge #127/099 from the eastern side along the shoulder of I-93. About 800 ft. of guardrail along the eastern side of the roadway may need to be replaced to increase clearances for construction vehicles and equipment. Two-lane traffic will be maintained during this phase of construction and will be shifted to the west, with a reduced roadway width of about 27 ft. (2'-12'-12'-1') to provide access for construction. Cofferdams will need to be installed within Salmon Brook along the north and south wall of Bridge #127/099 as well as the northwest and southwest wingwalls to conduct repair work. These cofferdams may be installed and removed at separate times. Conveyance through Salmon Brook will be maintained throughout construction.

Proposed rehabilitation of Bridge #124/096 includes the repairs of localized areas of spalled and delaminated concrete on the roof slab and southeast wingwall. Two lanes of traffic will be maintained throughout the duration of construction along I-93 southbound, with only a temporary shoulder closure. Temporary impacts will occur along Salmon Brook due to the placement of ladders to repair soffits at the channel ends of the bridge structure.

The proposed work for bridge rehabilitation is depicted on the Wetland Impact Plans included as **Appendix Q**.

4.0 Impact Analysis, Mitigation and Best Management Practices

The below is a description of the proposed impacts for the rehabilitation of the two I-93 bridges over Salmon Brook, followed by a description of proposed mitigation for the rehabilitation work.

4.1 Proposed Impacts

No permanent wetland impacts are required to complete the bridge repairs. However, approximately 997 sq. ft./170 ln. ft. of temporary bed impacts, approximately 610 sq. ft./80 ln. ft. of temporary bank impacts, and approximately 8 sq. ft. of impact to scrub-shrub wetlands are proposed to occur in order to access the underside of the bridge structures. Cofferdams will be used along Bridge #127/099 in order to conduct repair work along the north and south wall and the northwest and southwest wingwalls. Temporary impacts to scrub-shrub/emergent wetlands located north of Salmon Brook to the west of Bridge #127/099 may result from accessing the underside of the bridge from I-93. Conveyance through Salmon Brook will be maintained throughout construction; cofferdams on the north and south edges will not be installed simultaneously. Temporary impacts to the bed of Salmon Brook

around Bridge #124/096 will result from the placement of ladders/scaffolding to repair soffits at the channel ends of the bridge structure.

The water quality of Salmon Brook will be maintained throughout the duration of the proposed project. Erosion control measures will be installed in accordance with the Access and Erosion Control Plans in **Appendix R**. The contractor will be directed to contain concrete fragments and uncured concrete from impacting the brook while the repairs are being completed. Turbidity curtains will also be used within Salmon Brook, if necessary, to contain any sediment that is suspended during the installation of cofferdams. Prior to dewatering the contractor should evaluate the water quality to determine if water should be directly discharged into Salmon Brook or containerized for off-site disposal. The contractor will have additional appropriate erosion controls on-site should they be needed during the rehabilitation work.

Ground disturbance will also occur during the removal of the guardrail along the east side of Bridge #127/099. Perimeter controls will be installed and be maintained between the guardrail replacement and jurisdictional boundaries until the disturbed area is stabilized.

Refer to the Wetland Impact Summary table in **Appendix Q** for a break-out of temporary bed and bank impacts by the bridges.

4.2 Mitigation and Best Management Practices

No compensatory mitigation is necessary for the proposed project since no permanent impacts are proposed, as stated in Env-Wt 302.03(d). While no project-specific compensatory mitigation is proposed, Best Management Practices (BMPs) will be applied as necessary. These include the installation/application of general erosion and sediment control BMPs. Refer to the Access and Erosion Control Plans in **Appendix R** for further information.

5.0 Natural Resource Descriptions

The following is a description of the wetlands and surface waters, floodplains and floodways, and rare, threatened, and endangered species that occur within the proposed project area. In addition to the temporary impacts within the bed and bank of Salmon Brook, temporary impacts are also proposed within the scrub-shrub/emergent wetland located north of Salmon Brook to the west of Bridge #127/099.

5.1 Wetlands and Surface Waters

Salmon Brook flows northeast to southwest and first enters Giles Pond before flowing into the Pemigewasset River. The I-93 bridges over Salmon Brook are located approximately three miles northeast of where the brook enters the Pemigewasset River. Salmon Brook is not a designated river under the New Hampshire River Management and Protection Act (RSA 483).

Salmon Brook is listed as an impaired water in accordance with Section 303(d) of the Clean Water Act. Salmon Brook's waterbody ID is NHRIV700010802-07, and the cause for impairment is mercury and *Eschericia coli*, which mainly impacts aquatic life and swimming activities (refer to the Watershed Report Card in **Appendix O**). The proposed repairs to Bridge #127/099 and #124/096 will have neither negative nor positive effects on the water quality of the brook as the repairs are confined to the bridge structures themselves. Proper erosion control measures will be implemented as necessary during the repair work should any sedimentation or erosion occur as a result of the proposed repair work. The contractor will be directed to contain concrete fragments and uncured concrete to prevent impact to the brook.

A delineation of wetlands and surface waters within the vicinity of the I-93 northbound and southbound bridges was performed on November 13, 2015 by VHB Senior Environmental Scientist, Kristopher Wilkes, NH CWS #288 (refer to **Appendix N**, Wetland Resource Maps). Wetland delineations were performed in accordance with the technical criteria contained in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0* (January 2012). The *National Wetland Plant List – Northcentral-Northeast Region* (2016) published by the U.S. Army Corps of Engineers, the *Field Indicators of Hydric Soils in the United States, Version 7.0* published by the Natural Resources Conservation Service, and the *Field Indicators for Identifying Hydric Soils in New England, Version 3* published by the New England Interstate Water Pollution Control Commission were also used as technical references during the wetland delineation field work. Wetland vegetative cover type classifications were determined in the field using *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979, revised 1985). The limit of wetland boundaries were marked in the field using alpha-numerically coded pink flagging tape affixed to vegetation. The jurisdictional top-of-bank of Salmon Brook and centerline of intermittent tributaries flowing to the brook were marked in the field using alpha-numerically coded blue flagging tape affixed to vegetation.

5.1.1 Salmon Brook and Stream Crossing Assessment

I-93 NB Bridge Crossing (#127/099)

Salmon Brook is classified as Riverine, Lower Perennial, Unconsolidated Bottom, Cobble-Gravel/Sand (R2UB1/2). The brook at the Bridge #127/099 crossing was approximately 4.3 feet deep within the culvert at the time of assessment and an average of 50 feet wide upstream and 48 feet wide downstream. The dominant bed material within this location is sand with some cobble within the culvert structure. Only minor bank erosion was observed within the vicinity of the bridge structure along the left bank downstream of the bridge, and wetlands (described below) line the banks of the brook to the east and west of the bridge structure.

I-93 SB Bridge Crossing (#124/096)

The southern bank of Salmon Brook to the east of Bridge #124/096 is characterized by relatively steep vegetated slopes with some erosion (undercutting) present. Slopes along the northern bank of Salmon Brook to the east of Bridge #124/096, and northern and southern banks along the western side of the bridge, appear to be stable as they are more gradual and terraced. The brook at Bridge #124/096 is an average of 26 feet wide upstream and 43 feet wide downstream. Dominant bed material within this location are cobbles with some boulders. Bank vegetation consists of eastern hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), red pine (*Pinus resinosa*), eastern white pine (*Pinus strobus*), wintergreen (*Gaultheria procumbens*), hair cap moss (*Polytrichum commune*), maleberry (*Lyonia ligustrina*), royal fern (*Osmunda regalis*), and white meadowsweet (*Spiraea alba*).

Stream Crossing Assessment

A stream crossing assessment was performed on May 17, 2016 by Kristopher Wilkes and VHB Environmental Scientist Lindsay Jones. An assessment of both the I-93 northbound and southbound bridge crossings over Salmon Brook were completed in accordance with the *New Hampshire Stream Crossing Protocol, Version 2.0* (May 2014) published by the New Hampshire Department of Environmental Services (NHDES). In accordance with the NHDES protocols, the northbound crossing is defined as a culvert since it has a closed-bottom, and therefore a Culvert Assessment Field Form was completed for this crossing. A Bridge and Arch Assessment Field Form was completed for the southbound crossing. As part of this protocol, VHB collected a variety of data at each crossing including the type and condition of the crossing and associated roadway, geomorphic fish passage data, and wildlife data. Additionally, bankfull width measurements were collected upstream and downstream of the crossing as well as along a reference reach outside of the project area as part of this

assessment. The Assessment Field Forms and photos for each bridge structure are provided in **Appendix D**.

5.1.2 I-93 NB Bridge (#127/099) Wetlands

East of Bridge Crossing

Portions of a large wetland complex draining to Salmon Brook were delineated along the northern and southern banks of the brook to the east of the existing bridge crossing. Wetland delineated along the northern side of the brook is classified as Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded/Saturated (PSS1E). An intermittent stream, ranging from three to six feet wide, flows out of a pond located outside of the project area to the north and traverses through the scrub-shrub wetland before outletting to Salmon Brook. The intermittent channel is comprised of a sandy substrate with varying amounts of organic material and a bank height of one foot or less. Flow was observed to be moderate to high at the time of delineation. Dominant wetland vegetation within the scrub-shrub wetland surrounding the channel consists of speckled alder (*Alnus incana*), red maple, white meadowsweet, eastern white pine, sensitive fern (*Onoclea sensibilis*), glossy buckthorn (*Frangula alnus*), northern wild raisin (*Viburnum cassinoides*), species of willow (*Salix* spp.) and dogwood (*Cornus* spp.), steplebush (*Sipraea tomentosa*), jewelweed (*Impatiens capensis*), species of goldenrod (*Solidago* spp.), royal fern, fowl managrass (*Glyceria striata*), highbush blueberry (*Vaccinium corymbosum*), skunk cabbage (*Symplocarpus foetidus*), tussock sedge (*Carex stricta*), swamp dewberry (*Rubus hispidus*), and reed canary grass (*Phalaris arundinacea*). Evidence of wetland hydrology includes soil saturation, surface water, drainage patterns, and saturation visible on aerial imagery. Soils consisted of a mucky fine sand meeting the hydric soil indicator S:5; Sandy Redox.

Delineated wetland to the south of Salmon Brook and east of the bridge crossing is classified as Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded/Saturated (PFO1E). Dominant wetland vegetation consists of red maple, speckled alder, spinulose wood fern (*Dryopteris carthusiana*), royal fern, sphagnum (*Sphagnum* spp.), glossy buckthorn, swamp dewberry, interrupted fern (*Osmunda claytonia*), eastern hemlock, and various sedge species (*Carex* spp.). Portions of the wetland were flooded at the time of the delineation. Other evidence of wetland hydrology includes soil saturation, drainage patterns, and water stained leaves. Soils were saturated at the surface and met the criteria of hydric soil indicator S:5; Sandy Redox.

West of Bridge Crossing

Similar to the east of the bridge crossing, a large wetland complex draining to Salmon Brook was delineated along the northern and southern banks of the brook to the west of the existing bridge crossing. Delineated wetland bordering the north side

of Salmon Brook west of the bridge crossing is classified as a combination of Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, and Palustrine, Emergent, Persistent, Seasonally Flooded/Saturated (PSS/EM1E) wetland. A sinuous perennial tributary draining to Salmon Brook and bordered by wetlands is present to the north of Salmon Brook outside of the study limits. This feature was not delineated. Dominant wetland vegetation within the delineated PSS/EM1E wetland consists of giant goldenrod (*Solidago gigantea*), common winterberry (*Ilex verticillata*), maleberry (*Lyonia ligustrina*), reed canary grass, woolgrass (*Scirpus cyperinus*), white meadowsweet, steplebush, species of dogwood, soft rush, speckled alder, swamp dewberry, and various sedges. Evidence of wetland hydrology includes soil saturation, surface water, drainage patterns, and saturation visible on aerial imagery. The wetland contained sandy soil meeting the hydric soil indicator S:5; Sandy Redox. Minor temporary impacts associated with the proposed project are proposed within this wetland.

The delineated wetland bordering the south side of Salmon Brook to the west of the bridge crossing is classified as PSS1E wetland. Wetland plant species include speckled alder, glossy buckthorn, woolgrass, reed canary grass, white meadowsweet, giant goldenrod, rough-stemmed goldenrod (*Solidago rugosa*), sensitive fern, and various sedges, among others. Some beaver activity was observed within the wetland outside of the study limits. Wetland hydrology and soil indicators match those of the wetland delineated on the north side of Salmon Brook.

5.1.3 I-93 SB Bridge (#124/096) Wetlands

East of Bridge Crossing

No wetlands were identified bordering Salmon Brook to the east of the southbound bridge crossing.

West of Bridge Crossing

An intermittent stream draining to Salmon Brook was delineated along the northern side of Salmon Brook to the west of the bridge crossing. The intermittent channel varies from one to three feet wide and is fed by a culvert which appears to receive run-off from I-93. The intermittent channel is comprised of a sandy substrate with a varying amount of organic material and a bank height of one foot or less. Flow was observed to be moderate at the time of delineation.

A small PFO1E wetland borders the northern portion of the intermittent stream. Dominant wetland vegetation consists of red maple, sphagnum, swamp dewberry, spinulose wood fern (*Dryopteris carthusiana*), royal fern, eastern hemlock, white pine, species of horsetail (*Equisetum* spp.), sensitive fern, few narrow leaf cattail (*Typha angustifolia*), and skunk cabbage (*Symplocarpus foetidus*). Soils consist of a sapric organic layer of a mucky sand and are highly saturated. Evidence of wetland

hydrology includes surface water, saturation, moss-trim lines, water-stained leaves, and drainage patterns.

A PFO1E wetland draining to Salmon Brook was delineated along the southern side of Salmon Brook to the west of the bridge crossing. The wetland extends south and west beyond the limits of the study area. Dominant wetland vegetation consists of red maple, eastern hemlock, green ash (*Fraxinus pennsylvanica*), gray birch, (*Betula populifolia*), sphagnum, royal fern, spinulose wood fern, cinnamon fern (*Osmunda cinnamomea*), interrupted fern, skunk cabbage, and various sedges. Wetland soils consisted of a shallow mucky sand over a rocky subsurface. The wetland contains hummock-hollow micro-topography. Evidence of wetland hydrology consists of standing water, saturation, moss-trim lines, shallow roots, drainage patterns, and micro-topographic relief.

5.2 Floodplains and Floodways

The project area is located in a Special Flood Hazard Area (SFHA) Zone A of Salmon Brook with a base flood elevation of approximately 587 ft. (NAVD) near Bridge #127/099 as shown on the effective Flood Insurance Rate Map; Panel NO. 330080015B, dated June 15, 1979. (See **Appendix P.**) A detailed study was completed for the reach of Salmon Brook from just downstream of Bridge #124/096 to a point approximately 2,400 ft. upstream of Tilton Bridge Road. The Flood Insurance Study (FIS) completed for the Town of Sanbornton (December 1978) indicates a drainage area of 17.2 square miles for this portion of Salmon Brook that is located upstream of the I-93 bridges, with a 100-year peak discharge of 1,500 cfs. Base flood elevations in this reach range from 593 ft. (NAVD) to 587 ft. (NAVD). Base flood elevations for Salmon Brook approximately 1.5 miles south of the I-93 southbound bridge is 477 ft. (NAVD) where the brook crosses Prescott Road in Sanbornton.

There will be no change in the size of the hydraulic opening of the bridge. Since the proposed project involves surficial repairs of the bridge structure no permanent impacts will result. The temporary cofferdams are not expected to create flood issues in Salmon Brook. These cofferdams may be installed and removed at separate times. During construction, clean water conveyance of Salmon Brook through the work zone will be provided for at all times. (Refer to the Wetland Impact Plans in **Appendix Q.**)

5.3 Rare, Threatened, and Endangered Species

A search for the occurrence of rare plant, animal, or natural communities within the vicinity of the proposed project was completed using the NH Natural Heritage Bureau's (NHB) online Datacheck tool. A project report provided by the NHB, dated January 16, 2017, indicated that there are no recorded occurrences for sensitive

species near the project area. No further consultation with NHB is required at this time. Refer to **Appendix E**, Endangered Species Review, for the NHB report.

The proposed project was also reviewed for the presence of federally-listed or proposed, threatened or endangered species, designated critical habitat or other natural resources of concern through the US Fish and Wildlife Services' Information Planning and Conservation (IPaC) System. Results dated January 16, 2017 indicated Northern Long-eared Bat (*Myotis septentrionalis*) (NLEB) may occur within the vicinity of the project (refer to **Appendix G**).

The NLEB, a federally threatened species, prefers caves, mines, cracks, holes, or small crevices that are largely undisturbed and have stable temperatures for hibernation. The NLEB uses snags and live trees for roosting and their reproduction is slow, making the species especially vulnerable to population decline during times of disease or habitat loss. The proposed project will require the removal of select trees that are growing on or within close proximity to the bridges and may cause structural damage to the bridges if they remain.

Potential impacts to the NLEB were considered since the project involves work repairing cracks and other structural deficiencies on the bridge structure. The project was determined to *likely to adversely affect* the NLEB since the proposed project includes the removal of two mature trees around the bridge structures. A desktop assessment of the bridges from photos taken on October 8, 2016 do not indicate the presence of bats within the vicinity of the bridges. In accordance with the procedures contained in the *FHWA/FRA Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat*, May 2016, a Project Submittal Form and Bridge Assessment Form was completed to document this finding and submitted to the USFWS for concurrence on November 3, 2016 (see **Appendix H**, USFWS Correspondence). A letter of concurrence from the USFWS was received by NHDOT on March 1, 2017 (see **Appendix H**). No further consultation with the USFWS is required for the proposed project. Though unlikely to be present within the project limits, the involved parties will promptly notify the USFWS Concord Field Office upon finding a dead, injured, or sick NLEB.

5.4 Invasive Species

One invasive species, glossy buckthorn (*Frangula alnus*), was identified within the vicinity of Bridge #127/099 to the east of the bridge crossing. No vegetation is proposed to be removed around the two I-93 bridges except for two mature trees which are growing around the bridge structures and must be removed to prevent structural damage to the bridges. Since no other vegetation will be removed or soils disturbed as a result of the project, there are no threats to the spread of glossy buckthorn. However, all equipment should be cleaned of vegetation before leaving the site to reduce the risk of transporting invasive species to other areas.

6.0 Stream Crossings (Env-Wt 900)

The rehabilitation of Bridges #127/099 and #124/096 along I-93 over Salmon Brook must address the stream crossing standards as outlined in the New Hampshire Administrative Rule Env-Wt 900. Under these rules, stream crossings are classified as Tier 1, Tier 2, or Tier 3 based on the location of the project. This site meets the requirements of a Tier 3 classification as defined by Env-Wt 904.04(a): a Tier 3 stream crossing shall be a crossing located on a watercourse where the contributing watershed is 640 acres or greater.

The required Tier 3 stream crossing design criteria are provided below in italics. Responses on how the proposed crossing meets each requirement are provided below the pertinent regulations.

Env-Wt 904.04 Tier 3 Stream Crossings.

- (a) *Subject to (b), below, a tier 3 stream crossing shall be a crossing located:*
- (1) *On a watercourse where the contributing watershed is 640 acres or greater;*
 - (2) *Within a designated river corridor;*
 - (3) *On a watercourse that is listed on the surface water assessment 305(b) report in effect at the time of application as not attaining surface water quality standards for aquatic life based on one or more of the following:*
 - a. *Benthic macroinvertebrate index of biological integrity;*
 - b. *Fish assemblage index of biological integrity;*
 - c. *Habitat assessment; or*
 - d. *Stream channel stability;*
 - (4) *Within a 100-year flood plain or fluvial erosion hazard zone;*
 - (5) *In a jurisdictional area having any protected species or habitat; or*
 - (6) *In or within 100 feet of a wetland that has been designated by a municipality as a prime wetland pursuant to RSA 482-A:15, unless a waiver has been granted pursuant to RSA 482-A:11, IV(b).*

The watershed of Salmon Brook in the location of Bridges #127/099 and #124/096 is greater than 640 acres (totaling approximately 11,500 acres), therefore Salmon Brook is a Tier 3 stream (refer to **Appendix C**).

- (b) *The applicant for a project in which a stream crossing is categorized as tier 3 based solely on (a)(3) or (4), above, may request that the crossing be categorized as a tier one or tier 2 stream crossing, as applicable based on watershed size, if there are no impacts to the resource or the impacts to the resource are specifically mitigated in accordance with Env-Wt 800.*

Not applicable.

- (c) *If an applicant for a project in which a stream crossing is categorized as tier 3 based solely on (a)(5), above, wishes to have the crossing categorized as tier one or tier 2 based on watershed size, the applicant shall consult with the NHB if any protected plant species or habitat is impacted or the NHF&G if any protected wildlife species or habitat is impacted. The department shall downgrade the stream crossing to tier one or tier 2, with mitigation if necessary, if the NHB or NHF&G, as applicable, recommend such a downgrade.*

Not applicable.

- (d) *A tier 3 stream crossing shall be a span structure or an open-bottomed culvert with stream simulation, not a closed-bottom culvert or pipe arch.*

Bridge #124/096 spans Salmon Brook at the I-93 SB crossing, allowing the natural brook channel to flow under the bridge without obstruction. The proposed rehabilitation of the bridge will maintain the existing characteristics of the bridge including the open-bottom, allowing the brook to flow naturally underneath the bridge. Very minor bank erosion was noted along the southern bank of Salmon Brook along the eastern side of the bridge during the Stream Geomorphic Assessment (see **Appendix D**).

Bridge #127/0099 at the I-93 NB crossing also allows for natural stream flow underneath the bridge but is a closed-bottom culvert. Only low bank erosion was observed within the vicinity of Bridge #127/099. Like the proposed rehabilitation for Bridge #124/096, the rehabilitation for Bridge #127/099 will maintain the existing characteristics of the bridge with only surficial improvements. The existing culvert at Bridge #127/099 does not significantly constrict stream flow and only very minor bank erosion was noted during the Stream Geomorphic Assessment (see **Appendix D**).

- (e) *The applicant shall use an alternative design only if the request is submitted and approved as specified in Env-Wt 904.09.*

Refer to Env-Wt 904-09(c) below and the NHDOT 904.09 Technical Report in **Appendix D** for the alternative design discussion regarding the two I-93 bridges.

- (f) *Compensatory mitigation shall not be required for:*
- (1) *Any new tier 3 stream crossing that is self-mitigating; or*
 - (2) *Any replacement of a crossing that met all applicable requirements when originally installed but is in a location that results in the crossing being classified as tier 3 under these rules, provided the proposed stream crossing meets the requirements of Env-Wt 904.08.*

The proposed rehabilitation does not involve any permanent impacts, therefore no mitigation is required as stated in Env-Wt 302.03(d). Only temporary impacts are proposed in order to install cofferdams and ladders to conduct repair work.

A stream geomorphic assessment is provided in this application (see Section 5.2) and an Alternative Design Report is provided below which demonstrates that full compliance with the requirements of Env-Wt 904.08 are impractical since it would require full replacement of both bridges.

- (g) *Plans for a tier 3 stream crossing shall be stamped by a professional engineer who is licensed under RSA 310-A to practice in New Hampshire.*

See **Appendix Q and R** for a copy of the project plans which have been stamped by a NH professional licensed engineer.

- (h) *Construction involving in-stream work shall be limited to low flow conditions.*

The proposed work will likely be conducted over a 6- to 8-week period in late Summer or early Fall of 2017 during low flow conditions. Cofferdams will be used to conduct repair work at Bridge #127/099 during low flow conditions. Cofferdams will be used in such a way that will allow for the continual flow of Salmon Brook during the completion of the repair work.

- (i) *Crossings that require excavation in flowing water shall use best management practices, such as temporary by-pass pipes, culverts, or cofferdams, so as to maintain normal flows and prevent water quality degradation.*

No excavation work is proposed to occur as part of the rehabilitation of Bridge #127/099 and Bridge #124/096. All repair work is confined to the bridge structures themselves. Cofferdams will be used to conduct the structural repair work at Bridge #127/099 during low flow conditions.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings

- (a) *In accordance with the NH Stream Crossing Guidelines, University of New Hampshire, May 2009, which can be downloaded for free at <http://des.nh.gov/organization/divisions/water/wetlands/documents/nh-stream-crossings.pdf>;*

The I-93 bridges over Salmon Brook were constructed in 1962 prior to the development of the NH Stream Crossing Guidelines (May 2009) (referred to herein as "Guidelines"). Both bridges are in compliance with the Guidelines with the exception of the existing bankfull width of the structures. Additionally, Bridge #127/099 is a closed-bottom culvert and therefore does not comply with NHDES rule Env-Wt 904.04(d).

Bankfull Width

According to the Guidelines, the standard for streambed widths inside the bridge structure is 1.2 times the bankfull width plus 2 feet. The bankfull width at Bridge #127/099 is 48 feet and at Bridge #124/096 is 43.3 feet. (See **Table 1** below.)

Therefore, according to the Guidelines the recommended span width of a bridge structure at Bridge #127/099 would be approximately 59.6 feet, and at Bridge #124/096 would be approximately 53.9 feet. The proposed rehabilitation will maintain the existing bridge span of approximately 24 feet for Bridge #127/099 and 24 feet for Bridge #124/096, which may be restrictive of the natural geomorphic characteristics of Salmon Brook according to the Guidelines. However, as stated in the Guidelines, these standards do not apply for all situations and all streams, as the geomorphic characteristics of each stream is different. Bridges #127/099 and #124/096 have remained in good condition since their construction over various stream flow conditions through the years.

The standards for bankfull width outlined in the Guidelines are meant to ensure the balance of sediment erosion and deposition as well as aquatic organism passage. Currently the banks of Salmon Brook are in a stable condition upstream and downstream of both bridges. Only minor bank erosion was noted along the left bank of Salmon Brook downstream of Bridge #127/099, and no bank erosion was observed upstream and downstream of Bridge #124/096. Completing the surficial repairs to the underside of the I-93 bridges is the most cost-effective alternative at this time to address the structural deficiencies of the bridges. Replacing both bridges would significantly increase impacts to the brook and nearby wetland resources as a much wider bridge would need to be constructed with realignments of the roadways. Additionally, the existing span of both bridges does not restrict the passage of aquatic organisms during normal to high flow conditions. Therefore, it is recommended that the existing span of both bridges be maintained as proposed for the rehabilitation work.

Table 1: Bankfull Averages and Corresponding Recommended Span Width

Location	Transect Location (Reach)	Bankfull Average	Recommended Span Width (@1.2 x bankfull + 2ft)
I-93 Northbound	Upstream	49.6	61.5
	Downstream	38.4	48.1
	Reference	48	59.6
I-93 Southbound	Upstream	25.8	32.9
	Downstream	29	26.2
	Reference	43.3	53.9

Closed-Bottom Culvert

Bridge #127/099 is a closed-bottom box culvert and therefore is not in compliance with Env-Wt 904.04(d). According to the Guidelines, when considering a

structure to span a stream bridges are preferred to culverts, however bridges are not always practical in every situation. Bridges are preferred since they allow the natural stream characteristics to remain intact at the location of the stream crossing including bankfull widths, flow rates, and substrates. The existing culvert at Bridge #127/099 does not substantially constrict stream flow and only minor erosion was observed on the left bank downstream of the bridge. The bridge does not change the natural characteristics of the stream either upstream or downstream of the bridge. The bridge culvert is not a barrier to sediment transportation, but allows sediment to pass through the culvert. Additionally, the existing closed-bottom culvert does not hinder aquatic organism passage along Salmon Brook.

- (b) *With the bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing;*

Both bridge structures allow the water depths and flows of the brook to pass underneath the bridge at a variety of flows. The functioning of stream passage underneath the I-93 bridges contain some restrictions according to the recommended guidance material, as described in Env-Wt 904.05(a) above, however these restrictions do not appear to be hindering stream functions or streambed characteristics. The flow of Salmon Brook upstream of the bridge crossings appears to be similar to the flow downstream of the crossings under existing conditions. Refer to **Appendix D** for further information collected during the Stream Geomorphic Assessment.

- (c) *To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage;*

The bridges over I-93 do not allow wildlife passage through the bridges, even during low flow conditions. As explained in 904.05(a) above, the span of both bridges is narrower than the bankfull width of Salmon Brook, leaving no room for wildlife passage within the bridges. In order to provide wildlife passage corridors along both side of the watercourse underneath both bridges, both bridges would need to be replaced. Replacement of the I-93 bridges has been demonstrated to be impractical, as is further described in Env-Wt 904.09(c) below.

- (d) *To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain;*

The existing flow of Salmon Brook will be maintained after the proposed rehabilitation work is completed. No changes from the current conditions of the channel, flow regime, or floodplain of the brook will result from the proposed

project. Both bridges are placed in the direction of the natural flow of Salmon Brook, which is perpendicular to I-93 for Bridge #127/099 and skewed approximately 20 degrees to I-93 for Bridge #124/096. The proposed project involves repair work to the existing bridges; no changes to the hydraulic openings of the bridges nor the existing structural features of the bridges are proposed.

(e) To accommodate the 100-year frequency flood, to ensure that:

- (1) There is no increase in flood stages on abutting properties; and*
- (2) Flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability;*

The existing bridges pass the 100-year frequency flood and therefore meet this criterion. Since the proposed repair work will not change any structural qualities of the bridges there will be no increase in the flood stages upstream or downstream of the bridges associated with this project. Since the hydraulic opening will remain unchanged, the channel velocities are not affected by the project, thereby maintaining the sediment transport mechanisms and channel forms that already exist.

(f) To simulate a natural stream channel; and

The existing stream channel will be maintained during and after the proposed rehabilitation work is completed. No work will be conducted within the channel of Salmon Brook with the exception of the placement of temporary water diversion structures around areas where proposed structural repair work to the bridges are proposed.

(g) So as not to alter sediment transport competence.

The natural transportation of sediment within the stream channel will be maintained during and after the proposed rehabilitation work is completed. Water diversion structures and erosion control barriers will be installed, as necessary, during rehabilitation around areas of proposed structural repair work to minimize the potential of additional sediment entering the stream during rehabilitation.

Env-Wt 904.08 Replacing Tier 3 Existing Legal Stream Crossings

- (a) As part of an application for replacing an existing legal crossing that would be classified as a tier 3 stream under Env-Wt 904.04(a), the applicant shall provide an assessment of the geomorphic compatibility of the existing stream crossing based on the NH Stream Crossing Guidelines, University of New Hampshire, May 2009, which can be downloaded for free at http://www.unh.edu/erg/stream_restoration/.*

A Stream Geomorphic Assessment of the reach of Salmon Brook within the area of the bridges was conducted by VHB on May 17, 2016. A description of this assessment is provided in Section 5.1.1. Additionally, the data and pictures from the Stream Geomorphic Assessment are available in **Appendix D**.

- (b) A replacement tier 3 stream crossing shall comply with the specific design criteria in Env-Wt 904.05, unless a request for an alternative design is submitted and approved as specified in Env-Wt 904.09.*

As explained in Env-Wt 904.05(a) above, the proposed Tier 3 stream crossing rehabilitation complies with the specific design criteria as outlined in Env-Wt 904.05, with the exception of the existing bankfull width of both bridge structures. Additionally, Bridge #127/099 is a closed-bottom culvert and therefore does not comply with NHDES rule Env-Wt 904.04(d). Further information explaining why a fully compliant project is not practicable is provided in Env-Wt 904-09(c) below.

Env-Wt 904.09 Alternative Designs

- (a) If the applicant believes that installing the structure specified in the applicable rule is not practicable, as that term is defined in Env-Wt 101.73, the applicant may propose an alternative design in accordance with this section.*

The proposed rehabilitation of the existing bridge structure meets all of the standards outlined in the NH Stream Crossing Guidelines (May 2009), except that Bridges #127/099 and #124/096 do not provide a span of 1.2 times the bankfull width plus 2 feet, as explained above at Env-Wt 904.05(a). Bridge #127/099 is additionally not compliant because it is not an open-bottom culvert, as is also explained above at Env-Wt 904.05(a). Below in Env-Wt 904-09(c) we provide an alternative design report, as required by Env-Wt 904.09, which we believe demonstrates that a fully compliant project is not practicable.

- (b) To request approval of an alternative design, the applicant shall submit a written request to the department, accompanied by a technical report prepared by an environmental scientist or professional engineer that clearly explains how the proposed alternative meets the criteria for approval specified in (c) or (d), below, as applicable.*

See the information provided below, which provides the information required by Env-Wt 904.09(c).

- (c) The department shall approve an alternative design for a new tier 2 crossing, a replacement tier 2 crossing that does not meet the requirements of Env-Wt 904.07, or a new or replacement tier 3 crossing if:*
- (1) The report submitted pursuant to (b), above, demonstrates that adhering to the stated requirements is not practicable;*

- (2) The proposed alternative meets the specific design criteria specified in Env-Wt 904.05 to the maximum extent practicable; and*
- (3) The alternative design meets the general design criteria specified in Env-Wt 904.01.*

In order to fully comply with the NH Stream Crossing Guidelines, the existing bridge crossings at Bridge #127/099 and Bridge #124/096 would have to be replaced. During project planning, full bridge replacement of both bridges was considered as an alternative to the proposed action, but was rejected because:

- In general, the bridges themselves are structurally sound with only a few minor signs of deficiency:
 - Bridge #127/099: the walls of the culvert are in satisfactory condition with the exception of localized areas of spalling and delamination on both the north and south walls. Additionally, the wingwalls are in satisfactory condition with the exception of settlement of the northwest wingwall, causing separation between the culvert and wingwall. The roof slab is in poor condition with signs of cracking, spalling, delamination, and missing sections;
 - Bridge #124/096: the north and south frame walls are in good condition. The roof slab is in satisfactory condition with only minor areas of deterioration. The wingwalls are also in good condition;
- Replacement of the bridges would increase temporary impacts and cause permanent impacts to Salmon Brook during construction, whereas no permanent impacts are proposed for the rehabilitation;
- Replacement of the bridge abutments would substantially increase the cost of the project; and
- Based on the results of the geomorphic analysis, the existing spans of the two bridges do not significantly impact sediment transport characteristics or restrict the passage of aquatic organisms of Salmon Brook during normal to high flow conditions.

Due to the minor structural repairs proposed at this bridge crossing, in order for the bridge to be taken off the NHDOT Red List, full replacement of the bridge is impractical at this time. Based on the considerations listed above, the Guideline recommendations for full replacement of Bridge #127/099 and Bridge #124/096 were determined to be impractical at this time in order to achieve the 59.6 and 53.9 foot spans (respectively), and to achieve an open-bottom culvert for Bridge #127/099. Please also see the information provided above at Env-Wt 904.05.

- (d) The department shall approve an alternative design for a new tier one crossing or a replacement tier one crossing that does not meet the requirements of Env-Wt 904.07 if:*

- (1) The report submitted pursuant to (b), above, demonstrates that adhering to the rules is not practicable; and*
- (2) The alternative design meets the general design criteria specified in Env-Wt 904.01 to the maximum extent practicable.*

Not applicable.

Appendices A through R



Appendix A	Natural Resource Agency Coordination Meeting Minutes
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Appendix K	Representative Site Photos
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Appendix A

Natural Resource Agency Coordination Meeting Minutes



BUREAU OF ENVIRONMENT CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting

DATE OF CONFERENCE: October 19, 2016

LOCATION OF CONFERENCE: John O. Morton Building

ATTENDED BY:

NHDOT

Matt Urban
Sarah Large
Ron Crickard
Mark Hemmerlein
Marc Laurin
Kerry Ryan
Jon Evans
Anthony Weatherbee
Chris Carucci
Dave Smith
Victoria Chase
Gerald Bedard
Jon Hebert
Wendy Johnson
Ron Kleiner
Jessica D'Entremont
Charles Blackman

Maggie Baldwin
Keith Cota

Army Corps of Engineers

Michael Hicks

NHDES
Gino Infascelli
Lori Sommer
Mary Ann Tilton

NH Fish & Game

Carol Henderson

**NH Natural Heritage
Bureau**

Amy Lamb

**Consultants/Public
Participants**

Christine Perron
Vicki Chase
Mike Long
David Kull
Jed Merrow
Steve Hodgdon
Peter Walker
Chris Bean
Leo Tidd
Mark Hutchins
Michael Fowler
Janusz Czuzowski
Steve Hoffmann
Ben Martin

(When viewing these minutes online, click on an attendee to send an e-mail)

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH:

(minutes on subsequent pages)

Finalization of September Meeting Minutes	2
Andover 208/137, Non-Federal, 41189	2
Fracestown 139/102, Non-Federal, 41182	2
Grantham 140/069, Non-Federal, 41188.....	3
Enfield #12967B, (X-A001(087))	3
Bedford-Merrimack #16100 Bedford Toll Plaza (Non-Federal).....	5
Nashua-Merrimack-Bedford #13761 (Non-Federal).....	7
Ossipee #14749 (X-A000(490)).....	10
Sanbornton #16154 (X-A001(158))	12
Bedford #13953 (Z-A000(143))	13
Derry-Londonderry #13065 (IM-0931(201))	15

(When viewing these minutes online, click on a project to zoom to the minutes for that project)

The Bearcamp River is Essential Fish Habitat (EFH) for Atlantic salmon. The EFH Assessment has been submitted to the National Marine Fisheries Service. A response has not yet been received; however, it is not anticipated that the project will be considered a substantial impact to EFH.

A sensitive State-listed plant species occurs to the west of the project area in a location that will not be impacted by the project. A number of exemplary natural communities are located near or adjacent to the project. The one community that is directly adjacent to the project is a kettle hole bog. There is one existing culvert that outlets directly into kettle hole bog and NHDOT is not proposing repairs or replacement of this culvert. The 36" culvert that will be replaced carries a perennial stream under NH Route 16. From the outlet of this culvert, the stream then flows into another 36" culvert located under the rail line and eventually drains into the kettle hole bog system. The NH Natural Heritage Bureau did not have concerns with the proposed culvert replacement since the pipe is not being upsized and drainage patterns will not be altered to direct more roadway runoff into the kettle hole bog. The only other work that is proposed in the vicinity of the bog is paving. Amy Lamb asked that consideration be given to improving stormwater treatment in this area and/or improving the buffer between the roadway and bog.

The federally-listed small whorled pogonia was listed as a potential concern in the USFWS IPaC report. C. Perron noted that she has completed a number of field reviews throughout the project area this summer and approximately 5 years ago. The habitat types that may be impacted by the project primarily consist of mowed roadside, floodplain forest, scrub-shrub and emergent wetlands, and dry oak-pine upland forest, none of which are habitat types where this species is typically found. There is one area at the Lovell River that consists of dense hemlock and red maple with little ground cover. This area has been reviewed on two occasions and small whorled pogonia was not found. An email has been sent to Maria Tur at USFWS to seek concurrence that there are no concerns with this species.

Regarding northern long-eared bat, the project will require some tree clearing; however it is anticipated that the clearing will meet the criteria for concurrence under the FHWS Programmatic Consultation.

The project will result in impacts to the Lovell River and Bearcamp River floodplains. No impacts to the regulatory floodway are anticipated at either river. Floodplain impacts will consist of 1,174 CY of fill. The Department met last week with Mike Hicks (Army Corps) and Jennifer Gilbert (Office of Energy and Planning) to review proposed impacts. The Department is now in the process of identifying proposed mitigation for the floodplain impacts. Some mitigation will be in the form of design elements, such as moving bridge abutments back. There may also be some opportunity to provide an area of flood storage near the Lovell River. The Department will summarize impacts and proposed mitigation in a letter to the Army Corps and Office of Energy and Planning and will continue to coordinate as necessary.

This project has been previously discussed at the 1/16/2016 and 8/17/2016 Monthly Natural Resource Agency Coordination Meetings.

Sanbornton #16154 (X-A001(158))

Steve Hodgdon (VHB) provided an overview of this project, which involves repair of Sanbornton Bridges #127/099 and #124/096 which carry the northbound and southbound barrels of I-93 over Salmon Brook in the Town of Sanbornton.

Working from a set of slides (see attached), S. Hodgdon explained that northbound bridge is in generally good condition, but some minor repairs to the center joint of the roof slab and two wingwall joints on the downstream abutment, as well as some patching or crack-filling along the roof slab and walls. Short term lane closure and traffic shifts would be required during

construction. Currently, no permanent wetland impacts are anticipated. Temporary impacts would include installation of cofferdams and construction staging in the bed of Salmon Brook. It is not anticipated that construction equipment would need access within the bridge. Rather, short duration cofferdams would be placed intermittently along the culvert walls to repair concrete cracks/spalls which are located below the waterline.

Repairs at the southbound bridge are even more limited. Only minor repairs to the bridge fascias are required. No permanent impacts would be necessary, and temporary impacts would be limited to the installation of staging in the stream bed to allow workers to access the fascias. No dewatering or channel diversion structures are expected.

Carol Henderson asked whether the concrete repairs would involve removal of damaged concrete. S. Hodgdon responded that unsound concrete would be removed using hand tools to ensure that the new concrete adheres properly. C. Henderson requested that the contractor be required to take measures to prevent any deposition of material into the stream. S. Hodgdon confirmed that such measures would be included in the construction requirements, as is standard for these types of projects.

Mary Ann Tilton asked what percentage of the bridge surface area requires repair. S. Hodgdon estimated that the total repair is less than 1% of the total area inside the bridge. C. Henderson asked when the repairs would be completed. S. Hodgdon responded that the work would likely be conducted in 2018, but that the Department may accelerate this schedule. Mike Hicks asked for confirmation that all impacts would be temporary, and asked about the cofferdam construction type. S. Hodgdon responded that cofferdams could be constructed of marine plywood. M. Hicks explained that sheet piling or plywood cofferdams would not be considered fill, and therefore would be exempted from Section 404 jurisdiction. Sand bag cofferdam or other fill types would require a permit from the Corps.

Gino Infascelli indicated that, because this is a crossing of a Tier 3 stream, the project would be classified as a major impact project even with the limited impacts.

Mark Hemmerlein asked whether there was any evidence of scour damage to the bridge. S. Hodgdon confirmed that there was no scour observed; the stream is low gradient with low velocities such that this is not a concern.

Matt Urban asked whether there were adjacent wetlands that might be impacted for access. S. Hodgdon replied that wetlands had been delineated within and along the brook, but that the repairs require access by workers with hand tools and light equipment only. No temporary causeway or other impacts are anticipated.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

Bedford #13953 (Z-A000(143))

Marc Laurin stated that the Wetland Permit applications for the project, the widening of NH 101 from Wallace Road to NH 114/Boynton Street, have been provided to NHDES and ACOE. The

Appendix B

Mitigation Report/Coordination/ARM Calculators



Compensatory Mitigation

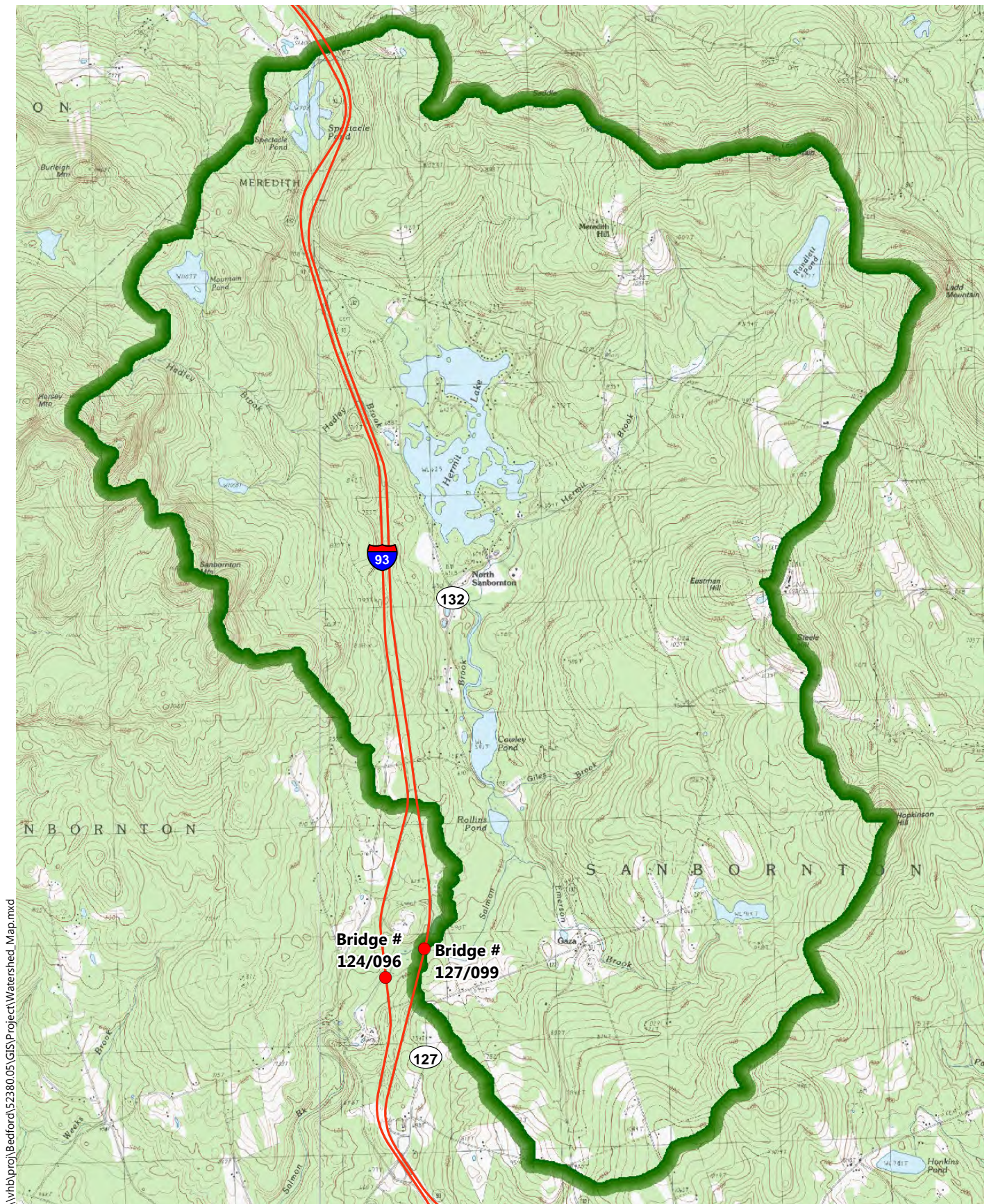
No compensatory mitigation is necessary for the proposed project because only temporary jurisdictional impacts are proposed. Per Env-Wt 302.03(d), mitigation is not required for impacts that are not intended to remain after the project is completed, provided the areas are restored in accordance with the approved project plans.

The approximately 997 sq. ft./170 ln. ft. of temporary bed impacts, approximately 610 sq. ft./80 ln. ft. of temporary bank impacts, and 8 sq. ft. of impacts to scrub-shrub/emergent wetland are associated with the installation of cofferdams, placement of equipment, and access. Following project completion, equipment and cofferdams will be removed from Salmon Brook and the impacted area will be restored. Therefore, no compensatory mitigation is proposed.

Appendix C

Watershed Map





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- Project Location
- ▭ Watershed

Sanbornton Bridge

Sanbornton, New Hampshire

Watershed Map

Source:USGS Stream Stats, VHB

Appendix D

NHDOT 904.09 Technical Report & Stream Crossing Forms



**NH Department of Transportation
Bureau of Bridge Design
Project, #16154
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.69 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

To fully comply with the specific design criteria in Env-Wt 904.05 for a tier 3 stream crossing, the existing bridge crossings at Bridge #127/099 and Bridge #124/096 would have to be replaced. During project planning, full bridge replacement of both bridges was considered as an alternative to the proposed action, but was rejected because:

- In general, the bridges themselves are structurally sound with only a few minor signs of deficiency;
- Replacement of the bridges would increase temporary impacts and cause permanent impacts to Salmon Brook during construction, whereas no permanent impacts are proposed for the rehabilitation;
- Replacement of the bridge abutments would substantially increase the cost of the project; and
- Based on the results of the geomorphic analysis, the existing spans of the two bridges do not significantly impact sediment transport characteristics or restrict the passage of aquatic organisms of Salmon Brook during normal to high flow conditions.

Full replacement of Bridge #127/099 is impractical because only minor structural repairs are proposed for the bridge to be taken off the NHDOT Red List. Similarly, only minor work is required to address deficiencies at Bridge #124/096. Compliance with the design criteria for tier 3 crossings would require full replacement and this was determined to be impractical given the cost and additional impacts required.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the *maximum extent practicable*, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

The I-93 bridges over Salmon Brook were constructed in 1962 prior to the development of the NH Stream Crossing Guidelines (May 2009) (referred to herein as “Guidelines”). Both bridges comply with the Guidelines except for the bankfull width recommendation. The proposed rehabilitation will maintain the existing bridge span of approximately 24 feet for Bridge #127/099 and 24 feet for Bridge #124/096. Full bridge replacement would be required to meet the bankfull width recommendation. Bridges

#127/099 and #124/096 have remained in good condition since their construction over various stream flow conditions through the years.

Additionally, Bridge #127/099 is a closed-bottom culvert and therefore does not comply with NHDES rule Env-Wt 904.04(d). Full replacement of the bridge would be required to comply with the rule. The closed-bottom culvert does not change the natural characteristics of the stream either upstream or downstream. The culvert is not a barrier to sediment transportation and does not hinder aquatic organism passage along Salmon Brook.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

Both bridge structures allow the water depths and flows of the brook to pass underneath the bridge at a variety of flows. The functioning of stream passage underneath the I-93 bridges contain some restrictions according to the recommended guidance material, as described in Env-Wt 904.05(a) above, however these restrictions do not appear to be hindering stream functions or streambed characteristics. The flow of Salmon Brook upstream of the bridge crossings appears to be similar to the flow downstream. Refer to the Stream Geomorphic Assessment in Appendix D for more information.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

The bridges over I-93 do not allow wildlife passage through the bridges, even during low flow conditions. The span of both bridges is narrower than the bankfull width of Salmon Brook, leaving no room for wildlife passage within the bridges. To provide wildlife passage corridors along both side of the watercourse underneath both bridges, both bridges would need to be replaced. Replacement of the I-93 bridges is considered impractical.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

The existing flow of Salmon Brook will be maintained after the proposed rehabilitation work is completed. No changes from the current conditions of the channel, flow regime, or floodplain of the brook will result from the proposed project. Both bridges are placed in the direction of the natural flow of Salmon Brook, which is perpendicular to I-93 for Bridge #127/099 and skewed approximately 20 degrees to I-93 for Bridge #124/096. The proposed project involves repair work to the existing bridges; no changes to the hydraulic openings of the bridges nor the existing structural features of the bridges are proposed.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

The existing bridges pass the 100-year frequency flood. The proposed repair work will not change any structural qualities of the bridges so there will be no increase in the flood stages upstream or downstream of the bridges associated with this project. Since the hydraulic opening will remain unchanged, the channel velocities will not be affected by the project, thereby maintaining the sediment transport mechanisms and channel forms that already exist.

(f) To simulate a natural stream channel.

The existing stream channel will be maintained during and after the proposed rehabilitation work is completed. Work within the channel of Salmon Brook is limited to the placement of temporary water diversion structures around areas where proposed structural repair work to the bridges are proposed.

(g) So as not to alter sediment transport competence.

The natural transportation of sediment within the stream channel will be maintained during and after the proposed rehabilitation work is completed. Water diversion structures and erosion control barriers will be installed during rehabilitation around areas of proposed structural repair work to minimize the potential of additional sediment entering the stream during rehabilitation.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

The existing bridges allow for the natural transport of sediment within the stream channel. This condition will be maintained during and after the proposed rehabilitation work is complete.

(b) Prevent the restriction of high flows and maintain existing low flows;

The existing bridges pass the 100-year frequency flood and have remained in good condition since their construction over various stream flow conditions through the years. The bridges do not appear to restrict high flows and maintain low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

Based on the results of the Stream Geomorphic Assessment, the bridges do not restrict the movement of aquatic life indigenous to the waterbody. Flows will be maintained during construction so as not to restrict movement of aquatic organisms.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

The proposed repair work will not change any structural qualities of the bridges. There will be no increase in the flood stages upstream or downstream of the bridges associated with this project.

(e) Preserve watercourse connectivity where it currently exists;

The proposed repair work will not change any structural qualities of the bridges. There will be no change in watercourse connectivity associated with this project.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

Watercourse connectivity currently exists. No remedial activities are required.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

The proposed repair work will not change any structural qualities of the bridges. Therefore, erosion, aggradation or scouring upstream or downstream of the crossing are not anticipated from the proposed work. Work within the channel of Salmon Brook is limited to the placement of temporary water diversion structures around areas where proposed structural repair work to the bridges are proposed.

(h) Not cause water quality degradation.

The proposed work will not change the structural qualities of the bridge or condition of the embankments. Water diversion structures and erosion control barriers will be installed during rehabilitation around areas of proposed structural repair work to minimize the potential of additional sediment entering the stream during rehabilitation.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

Culvert Assessment Field Form – Geomorphic & Habitat Parameters

Structure ID	I-93 NB over Salmon Brook		Unknown <input type="checkbox"/>	Structure Number	NH DOT #127/099
Observer(s)/ Organization(s)	K. Wilkes, L. Jones VHB		Tidal <input type="checkbox"/>	Date & Time	05/17/16, 9:20AM
Town	Sanbornton	Datum	NAD 83 State Plane	Latitude (N/S)	43.521924
Location	I-93 NB crossing over Salmon Brook			Longitude (E/W)	-71.612928
Crossing ID	NH DOT #127/099			Stream Name	Salmon Brook
Road Name	I-93			Road Type	<u>paved</u> gravel trail railroad
# of shoulder lanes	2			Crossing Condition	new <u>old</u> eroding collapsing rusted
# of travel lanes	2	Structure Materials	<u>Concrete</u> Plastic-Corrugated Plastic-Smooth Tank Stone Steel-Corrugated Steel-Smooth Aluminum-Corrugated Wood Other: _____	Structure skewed to roadway	<u>yes</u> no *slightly skewed SE & NW
# of culverts at crossing	1			Flow Conditions	unusually low <u>typical low</u>
Overflow pipe(s)	yes <u>no</u>				higher than average flood conditions
Inlet Headwall Material	Metal <u>Concrete</u> Masonry Gabion Dry Fit Stone Plastic Other None				

Geomorphic and Fish Passage Data

General

Floodplain filled by roadway approaches: entirely (> 3/4 of floodplain) partially (1/4 – 3/4 of floodplain) not significant

Structure within 1/2 mile downstream of a significantly steeper segment of stream: yes no unsure

Culvert slope as compared with the channel slope is: higher lower about the same

Water depth in the crossing matches that of stream: yes no (significantly deeper) no (significantly shallower)

Water velocity in crossing matches that of stream: yes no (significantly faster) no (significantly slower)

Upstream

Structure opening partially obstructed by (circle all that apply): wood sediment wood & sediment
 Screening at inlet: yes no deformation of culvert none other

Steep riffle present immediately upstream of structure: yes no

If channel avulses, stream will: cross road follow road cross and follow road unsure

Estimated distance avulsion would follow road: N/A (ft.)

Angle of stream flow approaching structure: sharp bend (45° - 90°) mild bend (5° - 45°)

Evidence of streambed erosion or aggradation immediately upstream of culvert: naturally straight channelized straight
erosion aggradation none

Culvert inlet: at grade cascade free fall

Upstream bankfull widths: 1.) 40' 2.) 47' 3.) 40' 4.) 56'* 5.) 57' (ft.)

*Erosion minor along banks, scouring bed holes
1

Reference bankfull widths: 1.) 52' 2.) 36' 3.) 31' 4.) 35' 5.) 38' (ft.)

Downstream

Water depth in culvert (at outlet): 4.3' (0.0 ft.)

Culvert outlet: at grade cascade free fall backwatered _____ (ft.) Stepped footers: yes no

Outlet drop (invert to water surface): 4.3' (0.0 ft.)

Pool present immediately downstream of structure: yes no

Pool depth at point of streamflow entry: ~5' (ft.)

Maximum pool depth: ~5' (0.0 feet)

Downstream bank heights are substantially higher than upstream bank heights: yes no

Hydraulic control type: bedrock boulders cobble gravel sand wood other: _____

Distance from downstream end of culvert to hydraulic control: 40' (ft.)

Slope from downstream end of culvert to hydraulic control: UNKNOWN (%)

Evidence of streambed erosion or aggradation immediately downstream of culvert: erosion aggradation none

Downstream bankfull widths: 1.) 42' 2.) 34' 3.) 47' 4.) 63' 5.) 54' (ft.)

	Upstream	Downstream	In Structure	
Dominant bed material (substrate) at structure (use codes below)	1 2 3 4 <u>5</u> 6 UNK	1 2 3 4 <u>5</u> 6 UNK	NONE 1 2 <u>3</u> 4 <u>5</u> 6 UNK	
Bedrock present	yes <u>no</u>	yes <u>no</u>	Depth of Substrate	<u>< 1 foot</u> 1-2 feet >2 feet UNK N/A
Sediment Deposit Type	none delta side point <u>mid-channel</u>	<u>none</u> delta side point mid-channel	<u>none</u> delta side point mid-channel	
Elevation of sediment deposits is greater than or equal to 1/2 bankfull elevation	yes <u>no</u>	yes <u>no</u>	yes <u>no</u>	
			Substrate Throughout? yes <u>no</u>	
Beaver dam near structure	yes <u>no</u>	yes <u>no</u>	Bed Material Codes 1 – bedrock 2 – boulder 3 – cobble 4 – gravel 5 – sand 6 – silt/clay UNK - unknown	
Distance from structure to dam	distance: <u>UNK</u> (ft.)	distance: <u>UNK</u> (ft.)		
Hard bank armoring	intact failing <u>none</u> UNK	intact failing <u>none</u> UNK		
Bank erosion	high <u>low</u> none	high <u>low*</u> none		
Stream bank scour causing undermining around/under structure (circle all that apply)	<u>none</u> culvert footers wing walls	<u>*confined to left bank, minimal</u> <u>none</u> culvert footers wing walls		

Wildlife Data (left/right bank determined facing downstream)	Upstream		Downstream		Vegetation Type Codes C – coniferous forest D – deciduous forest M – mixed forest S – shrub/sapling H – herbaceous/grass B – bare R – road embankment
	LEFT	RIGHT	LEFT	RIGHT	
Dominant vegetation type (use codes to the right)	S	S	S	S	
Does a band of shrub/forest vegetation that is at least 50' wide start within 25' of structure and extend 500' or more up/downstream?	(yes) no	yes (no)* *Residential Lawn Present	(yes) no	(yes) no	
Road-killed wildlife within ¼ mile of structure (circle none or list species)	species:			(none)	
Wildlife sign and species observed near (up/downstream) and inside structure (circle none or list species and sign types)	Outside Structure		Inside Structure		
	species (none)	sign	species (none)	sign	
	Beaver	Cut stumps along banks	none		

Spatial data collected with GPS: (yes) no Comments/Drawings: Refer to wetland delineation data collected on 11/13/2015.

Photos taken: (yes) no
Please fill out photo log below

Folder Name:	Structure Inlet	Structure Outlet	Above Structure
Photo View - Upstream	DSCN 5501 <input checked="" type="checkbox"/>	DSCN 5499 <input checked="" type="checkbox"/>	<input type="checkbox"/>
Photo View - Downstream	DSCN 5529 <input checked="" type="checkbox"/>	DSCN 5524 <input checked="" type="checkbox"/>	DSCN 5520 <input checked="" type="checkbox"/>

Record the file name for each photo taken in the appropriate box

Crossing Type (from above): ☐ 1. ☐ 2. ☒ 3. ☐ 4. ☐ 5. ☐ Ford

	Ⓐ	Ⓑ	Ⓒ	Ⓓ
Upstream Dimensions (ft.)	24'	16'	N/A	N/A
Downstream Dimensions (ft.)	24'	16'	N/A	N/A

Length of stream through crossing (ft.): 113' EST

Crossing Slope (%): 0% per 1962 plans

Note: When inventorying multiple culverts, label left culvert 1 and go in increasing order from left to right from downstream end (outlet) to looking upstream.
 *East box culvert has slightly settled over time, likely a small (-0.3% +/-) cross slope in east box.

Culvert Cell 2 of _____

Crossing Type (from above): ☐ 1. ☐ 2. ☐ 3. ☐ 4. ☐ 5.

	Ⓐ	Ⓑ	Ⓒ	Ⓓ
Upstream Dimensions (ft.)				
Downstream Dimensions (ft.)				

Length of stream through crossing (ft.): _____

Crossing Slope (%): _____

Culvert Cell 3 of _____

Crossing Type (from above): ☐ 1. ☐ 2. ☐ 3. ☐ 4. ☐ 5.

	Ⓐ	Ⓑ	Ⓒ	Ⓓ
Upstream Dimensions (ft.)				
Downstream Dimensions (ft.)				

Length of stream through crossing (ft.): _____

Crossing Slope (%): _____

Culvert Cell 4 of _____

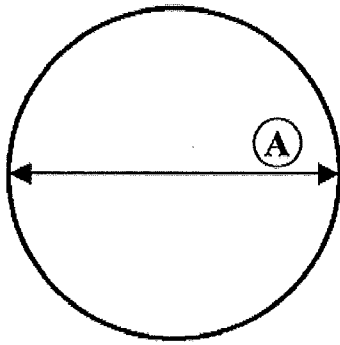
Crossing Type (from above): ☐ 1. ☐ 2. ☐ 3. ☐ 4. ☐ 5.

	Ⓐ	Ⓑ	Ⓒ	Ⓓ
Upstream Dimensions (ft.)				
Downstream Dimensions (ft.)				

Length of stream through crossing (ft.): _____

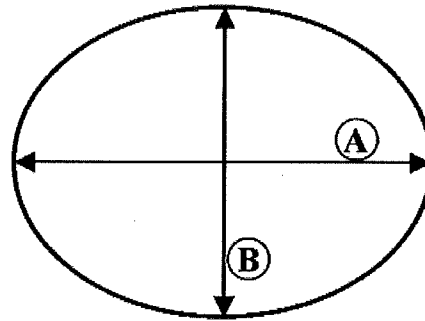
Crossing Slope (%): _____

1.



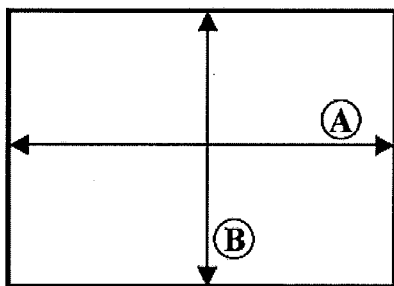
Round Culvert

2.



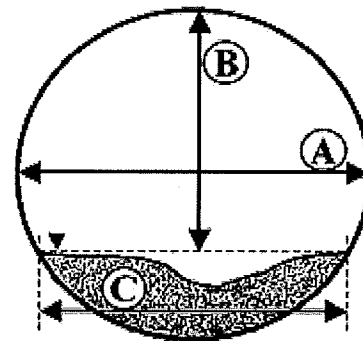
Elliptical Culvert

3.



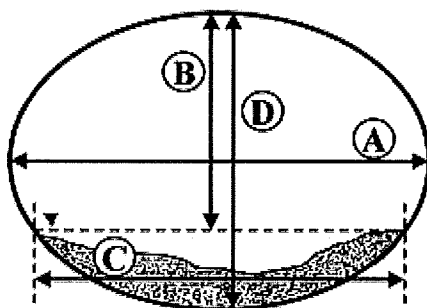
Box Culvert

4.



Embedded Round Culvert

5.



Embedded Elliptical Culvert

Bridge and Arch Assessment Field Form – Geomorphic & Habitat Parameters

Structure type: **bridge / arch**

Structure ID	I-93 SB over Salmon Brook Unknown <input type="checkbox"/>			Structure Number	NH DOT #124/096
Observer(s)/ Organization(s)	K. Wilkes, L. Jones VHB	Tidal <input type="checkbox"/>		Date & Time	05/17/16, 12:45 PM
Town	Sanbornton	Datum	NAD 83 State Plane	Latitude (N/S)	43.519587
Location	I-93 SB crossing over Salmon Brook			Longitude (E/W)	-71.617314
Crossing ID	NH DOT #124/096			Stream Name	Salmon Brook
Road Name	I-93			Road Type	<u>paved</u> gravel trail railroad
# of shoulder lanes	2			Crossing Condition	new <u>old</u> eroding collapsing rusted
# of travel lanes	2	Structure Materials	Aluminum <u>Concrete</u> Masonry (arches) & Slabs Prestressed Concrete/ Post-tensioned Steel Timber Wood Other: _____	Structure skewed to roadway	yes <u>no</u>
# of bridge cells or arches at crossing	1			Flow Conditions	unusually low <u>typical low</u> higher than average flood conditions
Overflow pipe(s)	yes <u>no</u>				
Inlet Headwall Material	Metal <u>Concrete</u> Masonry Gabion Dry Fit Stone Plastic Other None				

Geomorphic and Fish Passage Data

General

Floodplain filled by roadway approaches: **entirely** (> 3/4 of floodplain) **partially** (1/4 - 3/4 of floodplain) not significant
 Structure within 1/2 mile downstream of a significantly steeper segment of stream: yes no unsure
 Water depth in the crossing matches that of stream: yes no (significantly deeper) no (significantly shallower)
 Water velocity in the crossing matches that of stream: yes no (significantly faster) no (significantly slower)

Upstream

Structure opening partially obstructed by (circle all that apply): wood sediment wood & sediment
 failure of bridge none other: _____

Steep riffle present immediately upstream of structure: yes no
 If channel avulses, stream will: cross road follow road cross and follow road unsure
 Estimated distance avulsion would follow road: N/A (ft.)
 Angle of stream flow approaching structure: sharp bend (45° - 90°) mild bend (5° - 45°)
 naturally straight channelized straight

Evidence of streambed erosion or aggradation immediately upstream of bridge: erosion aggradation none
 Upstream bankfull widths: 1.) 25' 2.) 26' 3.) 26' 4.) 26' 5.) 26' (ft.)

Reference bankfull widths: 1.) 28' 2.) 28' 3.) 29' 4.) 29' 5.) 31' (ft.)

Downstream

Pool present immediately downstream of structure: yes no

Pool depth at point of streamflow entry: ~3 * (0.0 feet) * Pool approximately 20' long starting 10' downstream of structure

Maximum pool depth: ~4 (0.0 feet)

Downstream bank heights are substantially higher than upstream bank heights: yes no

Stepped footers: yes no *streambed substrate*

Hydraulic control type: bedrock boulders cobble gravel sand wood other: _____

Distance from downstream end of bridge/arch to hydraulic control: N/A (ft.)

Evidence of streambed erosion or aggradation immediately downstream of bridge: erosion aggradation none

Downstream bankfull widths: 1.) 30' 2.) 40' 3.) 43' 4.) 60' 5.) _____ (ft.)

	Upstream	Downstream	In Structure
Dominant bed material at structure (use codes below)	1 2 <u>3</u> 4 5 6 UNK	1 <u>2</u> 3 4 5 6 UNK	1 2 <u>3</u> 4 5 6 UNK
Bedrock present	<u>yes</u> <u>no</u>	<u>yes</u> <u>no</u>	<u>yes</u> <u>no</u>
Sediment deposit types (circle all that apply)	<u>none</u> <u>delta</u> <u>side</u> <u>point</u> <u>mid-channel</u>	<u>none</u> <u>delta</u> <u>side</u> <u>point</u> <u>mid-channel</u>	<u>none</u> <u>delta</u> <u>side</u> <u>point</u> <u>mid-channel</u>
Elevation of sediment deposits is greater than or equal to 1/2 bankfull elevation	<u>yes</u> <u>no</u>	<u>yes</u> <u>no</u>	<u>yes</u> <u>no</u>
Beaver dam near structure	<u>yes</u> <u>no</u>	<u>yes</u> <u>no</u>	Bed Material Codes 1 – bedrock 2 – boulder 3 – cobble 4 – gravel 5 – sand 6 – silt/clay UNK - unknown
Distance from structure to dam	distance: _____ (ft.)	distance: _____ (ft.)	
Hard bank armoring	<u>* intact</u> <u>failing</u> <u>none</u> UNK	<u>* intact</u> <u>failing</u> <u>none</u> UNK	
Bank erosion	<u>high</u> <u>low</u> <u>none</u>	<u>high</u> <u>low</u> <u>none</u>	
Stream bank scour causing undermining around/under structure (circle all that apply)	<u>none</u> <u>abutments</u> <u>footers</u> <u>wing walls</u>	<u>* Same as upstream</u> <u>none</u> <u>abutments</u> <u>footers</u> <u>wing walls</u>	

* Large boulders placed on both banks within 30' of crossing

Wildlife Data (left/right bank determined facing downstream)	Upstream		Downstream		Vegetation Type Codes C – coniferous forest D – deciduous forest M – mixed forest S – shrub/sapling H – herbaceous/grass B – bare R – road embankment
	LEFT	RIGHT	LEFT	RIGHT	
Dominant vegetation type (use codes to the right)	C*	C*	D	M	
Does a band of shrub/forest vegetation that is at least 50' wide start within 25' of structure and extend 500' or more up/downstream?	* Red maple <u>yes</u> <u>no</u>	<u>in understory</u> <u>yes</u> <u>no</u>	<u>yes</u> <u>no</u>	<u>yes</u> <u>no</u>	

Road-killed wildlife within ¼ mile of structure (circle none or list species)	species: <i>cyote</i> none			
Wildlife sign and species observed near (up/downstream) and inside structure (circle none or list species and sign types)	Outside Structure		Inside Structure	
	species (none)	sign	species (none)	sign
	<i>Beaver</i>	<i>chewed/cut saplings</i>	<i>(none)</i>	

Spatial data collected with GPS: ☒ yes ☐ no **Comments/Drawings:** *Refer to wetland delineation data collected on 11/13/2015.*

Photos taken: ☒ yes ☐ no
Please fill out photo log below

Folder Name:	Structure Inlet		Structure Outlet		Above Structure	
Photo View - Upstream	<i>DSCN5541</i>	<input checked="" type="checkbox"/>	<i>DSCN5543</i>	<input checked="" type="checkbox"/>	<i>DSCN5557</i>	<input checked="" type="checkbox"/>
Photo View - Downstream	<i>DSCN5560</i>	<input checked="" type="checkbox"/>	<i>DSCN5564</i>	<input checked="" type="checkbox"/>	<i>DSCN5571</i>	<input checked="" type="checkbox"/>

Record the file name for each photo taken in the appropriate box

Crossing Type (from above): ☐ 1. ☒ 2. ☐ 3. ☐ 4. ☐ Ford

↖ 3-sided concrete structure

	Ⓐ	Ⓑ	Ⓒ	Ⓓ
Upstream Dimensions (ft.)	25.5' EST.	14.7'	N/A	N/A
Downstream Dimensions (ft.)	25.5' EST	14.7'	N/A	N/A

Length of stream through crossing (ft.): 59.5' EST.

Crossing Slope (%): -0.83% EST. from 1962 Plans

Note: When inventorying multiple culverts, label left culvert 1 and go in increasing order from left to right from downstream end (outlet) to looking upstream.

Bridge/Arch Cell 2 of _____

Crossing Type (from above): ☐ 1. ☐ 2. ☐ 3. ☐ 4.

	Ⓐ	Ⓑ	Ⓒ	Ⓓ
Upstream Dimensions (ft.)				
Downstream Dimensions (ft.)				

Length of stream through crossing (ft.): _____

Crossing Slope (%): _____

Bridge/Arch Cell 3 of _____

Crossing Type (from above): ☐ 1. ☐ 2. ☐ 3. ☐ 4.

	Ⓐ	Ⓑ	Ⓒ	Ⓓ
Upstream Dimensions (ft.)				
Downstream Dimensions (ft.)				

Length of stream through crossing (ft.): _____

Crossing Slope (%): _____

Bridge/Arch Cell 4 of _____

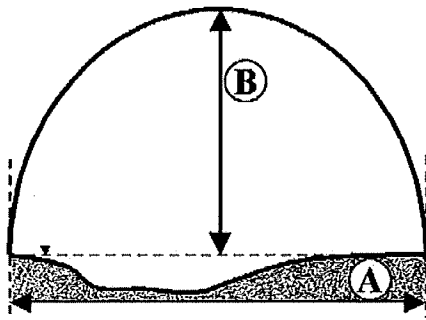
Crossing Type (from above): ☐ 1. ☐ 2. ☐ 3. ☐ 4.

	Ⓐ	Ⓑ	Ⓒ	Ⓓ
Upstream Dimensions (ft.)				
Downstream Dimensions (ft.)				

Length of stream through crossing (ft.): _____

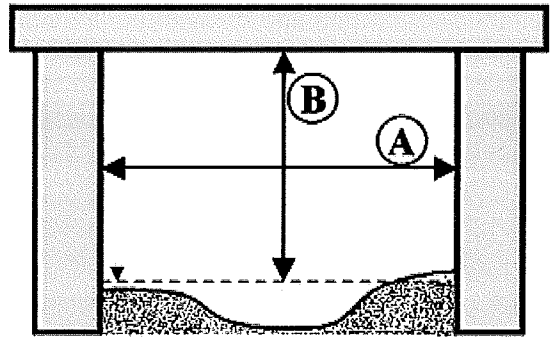
Crossing Slope (%): _____

1.



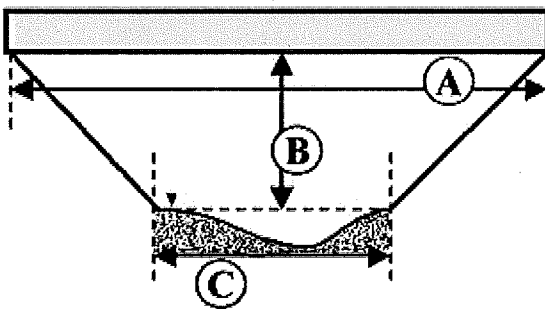
Open Bottom Arch

2.



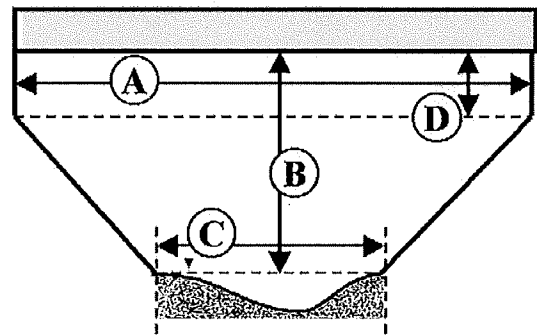
Bridge with Abutments

3.



Bridge with Side Slopes

4.



Bridge w/ Side Slopes & Abutments

Appendix E

NHB Results





New Hampshire Natural Heritage Bureau

To: Lindsay Jones
2 Bedford Farms Drive Suite 200
Bedford, NH 03110-6532

Date: 1/16/2017

From: NH Natural Heritage Bureau

Re: Review by NH Natural Heritage Bureau of request dated 1/16/2017
NHB File ID: NHB17-0195

Applicant: Robert Landry

Location: Tax Map(s)/Lot(s):
Sanbornton

Project Description: The NH Department of Transportation (NHDOT) proposes to repair NHDOT Bridges #127/099 and #124/096 which carries I-93 northbound and southbound (Interstate Highway) over Salmon Brook in the Town of Sanbornton. The project is expected to improve the sufficiency rating of the northbound bridge and to resolve deficiencies found in the southbound bridge.

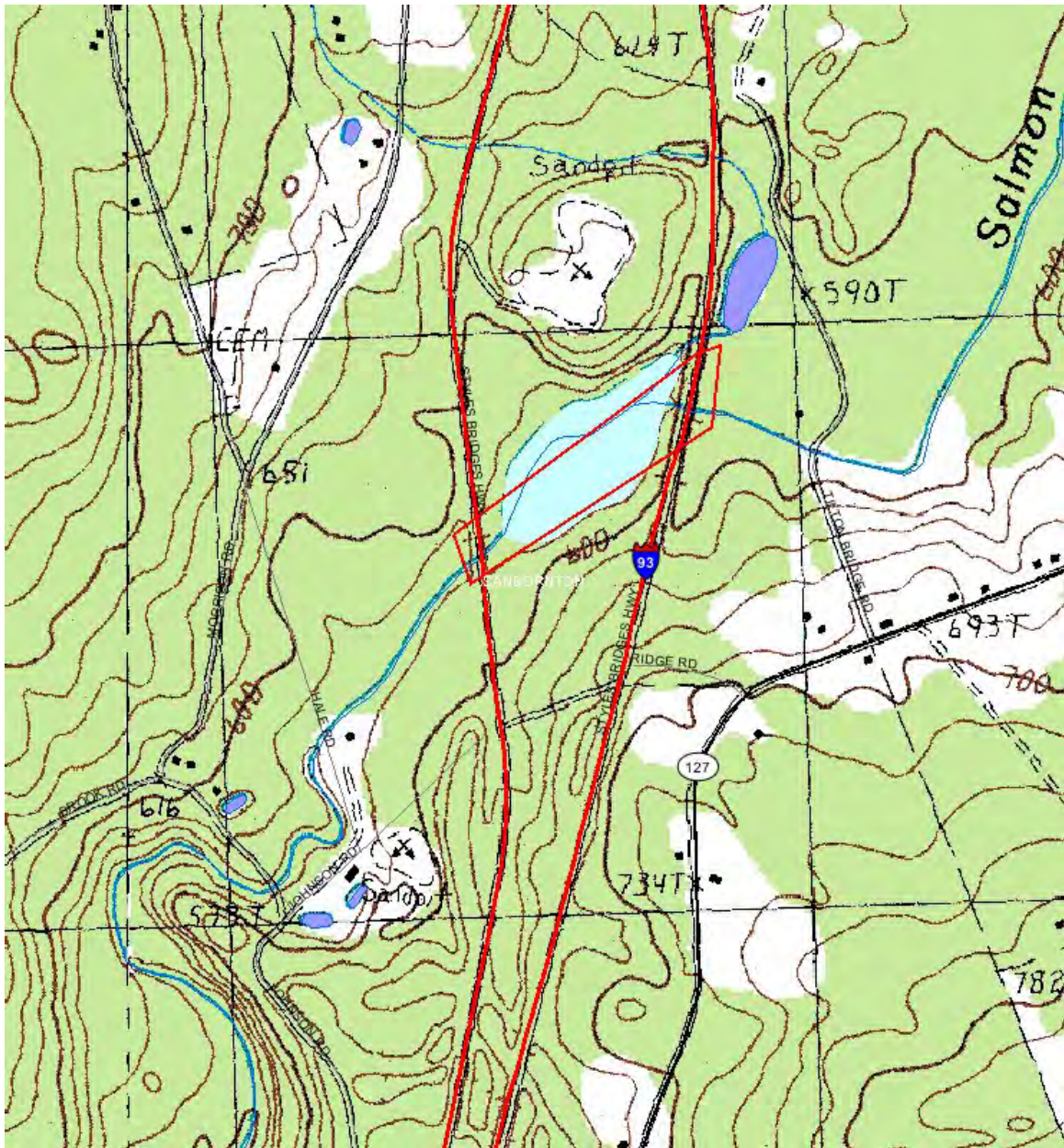
The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

This report is valid through 1/15/2018.



MAP OF PROJECT BOUNDARIES FOR NHB FILE ID: NHB17-0195



Appendix F

NHB & NHF&G Correspondence



Not Applicable

Appendix G

USFWS IPaC Results





United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 COMMERCIAL STREET, SUITE 300
CONCORD, NH 03301
PHONE: (603)223-2541 FAX: (603)223-0104
URL: www.fws.gov/newengland

Consultation Code: 05E1NE00-2017-SLI-0657

January 16, 2017

Event Code: 05E1NE00-2017-E-01072

Project Name: Rehabilitation of Sanbornton 16154 Bridges over Salmon Brook

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment



United States Department of Interior
Fish and Wildlife Service

Project name: Rehabilitation of Sanbornton 16154 Bridges over Salmon Brook

Official Species List

Provided by:

New England Ecological Services Field Office

70 COMMERCIAL STREET, SUITE 300

CONCORD, NH 03301

(603) 223-2541

<http://www.fws.gov/newengland>

Consultation Code: 05E1NE00-2017-SLI-0657

Event Code: 05E1NE00-2017-E-01072

Project Type: TRANSPORTATION

Project Name: Rehabilitation of Sanbornton 16154 Bridges over Salmon Brook

Project Description: The NH Department of Transportation (NHDOT) proposes to repair NHDOT Bridges #127/099 and #124/096 which carries I-93 northbound and southbound (Interstate Highway) over Salmon Brook in the Town of Sanbornton. The project is expected to improve the sufficiency rating of the northbound bridge and to resolve deficiencies found in the southbound bridge.

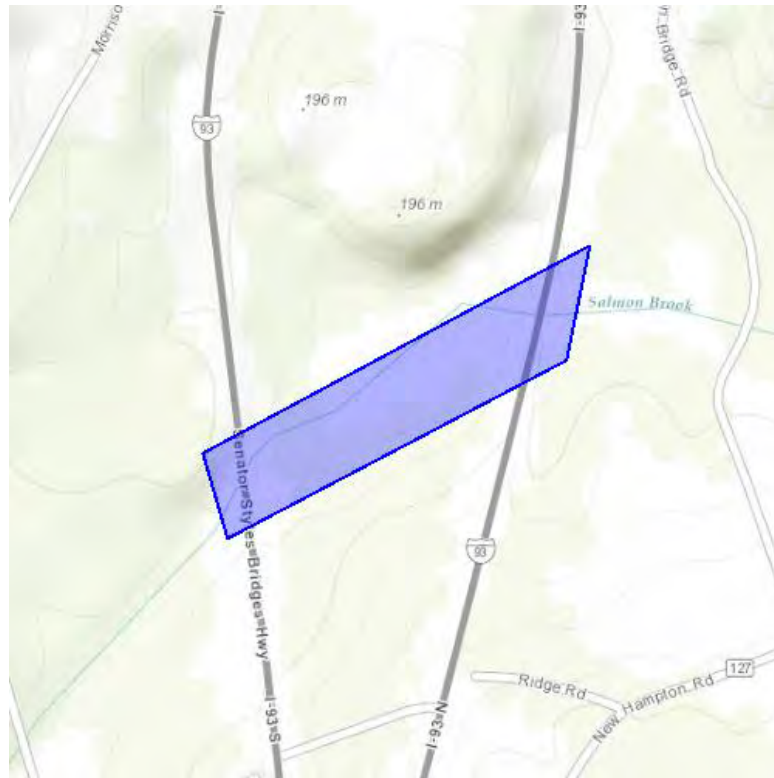
Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.



United States Department of Interior
Fish and Wildlife Service

Project name: Rehabilitation of Sanbornton 16154 Bridges over Salmon Brook

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-71.61777019500734 43.520298472914284, -71.61195516586305 43.52255457441643, -71.61229848861696 43.521309839193044, -71.6173839569092 43.51936488899411, -71.61777019500734 43.520298472914284)))

Project Counties: Belknap, NH



United States Department of Interior
Fish and Wildlife Service

Project name: Rehabilitation of Sanbornton 16154 Bridges over Salmon Brook

Endangered Species Act Species List

There are a total of 1 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Mammals	Status	Has Critical Habitat	Condition(s)
Northern long-eared Bat (<i>Myotis septentrionalis</i>) Population: Wherever found	Threatened		



United States Department of Interior
Fish and Wildlife Service

Project name: Rehabilitation of Sanbornton 16154 Bridges over Salmon Brook

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Appendix H

USFWS Correspondence



Federal Highway Administration (FHWA), Federal Railroad
Administration (FRA), and Federal Transit Administration (FTA)

Range-wide Programmatic Consultation for
Indiana Bat and Northern Long-eared Bat

Project Submittal Form

Updated May 2016

In order to use the range-wide programmatic consultation to fulfill Endangered Species Act consultation requirements, transportation agencies must use this submittal form (or a comparable Service approved form) to provide project-level information for all actions that may affect the Indiana bat and/or northern long-eared bat (NLEB). The completed form should be submitted to the appropriate U.S. Fish and Wildlife Service (Service) Field Office prior to project commencement. For more information, see the Standard Operating Procedure for Site Specific Project(s) Submission in the User's Guide.

By submitting this form, the transportation agency ensures that the proposed project(s) adhere to the criteria and conditions of the range-wide programmatic consultation, as outlined in the biological assessment (BA) and biological opinion (BO). Upon submittal of this form, the appropriate Service Field Office may review the project-specific information provided and request additional information. For projects that may affect, but are not likely to adversely affect (NLAA) the Indiana bat and/or NLEB, if the applying transportation agency is **not** contacted by the Service with any questions or concerns within 14 calendar days of form submittal, it may proceed under the range-wide programmatic consultation and assume concurrence of the NLAA determination made by the Service in the BO. For projects that may affect, and are likely to adversely affect (LAA) the Indiana bat and/or the NLEB, the appropriate Service Field Office will respond (see recommended response letter template) within 30 calendar days of receiving a complete project-level submission, which includes, but may not be limited to this completed form.

Further instructions on completing the submittal form can be found by hovering your cursor over each text box.

1. Date: November 3, 2016

2. Lead agency:

This refers to the Federal governmental lead action agency initiating consultation; select FHWA, FRA or FTA as appropriate

3. Requesting agency: New Hampshire Department of Transportation

This refers to the transportation agency completing the form (it may or may not be the same as the Lead Agency).

- Name: Robert Landry

- Title: Chief of Consultant Section, Bureau of Bridge Design

- Phone: 603-271-2731
- Email: rlandry@dot.state.nh.us

4. Consultation code¹: 05E1NE00-2016-SLI-0858

5. Project name(s): NHDOT Bridges #127/099 and #124/096 over Salmon Brook

6. Project description:

Please attach additional documentation or explanatory text if necessary

The objective of the project is to repair NHDOT Bridges #127/099 and #124/096 which carries I-93 northbound and southbound (Interstate Highway) over Salmon Brook in the Town of Sanbornton. The repairs along the northbound bridge include full-depth concrete reconstruction along the center joint of the roof slab, grouting two wingwall joints, and patching or crack-filling areas along the roof slab and walls. The southbound bridge includes repairs in localized areas of spalled and delaminated concrete on the roof slab and southeast wingwall. The project is expected to improve the sufficiency rating of the northbound bridge and to resolve deficiencies found in the southbound bridge.

7. Project location (county, state): Merrimack, New Hampshire

If not delineated in IPaC, attach shape files

8. For other species from IPaC official species list:

No effect – project(s) are inside the range, but no suitable habitat (see additional information attached).

✓ May affect – see additional information provided for those species (see attached or forthcoming).

Please confirm and identify how the proposed project(s) adhere to the criteria of the BO by completing the following (see User Guide Section 2.0):

¹ Available through IPaC System Official Species List: <https://ecos.fws.gov/ipac/>

NO EFFECT

9. For Indiana bat/NLEB, if applicable, select your no effect determination:

No effect – project(s) are outside the species' range. *submittal form complete*

No effect – project(s) are inside the species range but no suitable forested bat habitat; must also be greater than 0.5 miles from any hibernaculum. *submittal form complete*

No effect – project(s) do not involve any construction activities (e.g., bridge assessments, property inspections, planning and technical studies, property sales, property easements, and equipment purchases). *submittal form complete*

No effect – project(s) are completely within existing road/rail surface and do not involve percussive or other activities that increase noise above existing traffic/background levels (e.g., road line painting). *submittal form complete*

No effect – project(s) includes maintenance, alteration, or demolition of bridge(s)/structure(s) and indicate(s) no signs of bats from results of a bridge/structure assessment. *submittal form complete*

Otherwise, please continue below.

MAY AFFECT, NOT LIKELY TO ADVERSELY EFFECT – W/O AMMS

10. For Indiana bat/NLEB, if applicable, select your may affect, NLAA determination (without implementation of AMMs):

NLAA – project(s) are inside the range and suitable bat habitat is present, but **negative** bat presence/absence (P/A) surveys; must also be greater than 0.5 miles from any hibernaculum. *submittal form complete*

NLAA – project(s) within suitable bat habitat that involve maintenance of existing facilities (e.g., rest areas, stormwater detention basins) but do not remove or alter the habitat (e.g., mowing, brush removal). *submittal form complete*

NLAA – project(s) within 300 feet of existing road/rail surfaces in areas that contain suitable habitat but do not remove or alter the habitat (e.g., mowing, brush removal). *submittal form complete*

NLAA – project(s) limited to slash pile burning. *submittal form complete*

NLAA –project(s) are limited to wetland or stream protection activities associated with compensatory wetland mitigation that do not clear suitable habitat. *submittal form complete*

Otherwise, please continue below.

MAY EFFECT, NOT LIKELY TO ADVERSELY AFFECT – WITH AMMs

11. For Indiana bat/NLEB, if applicable, document your may affect, NLAA determination by completing the following section (**with implementation of AMMs**; use #13 to document AMMs).

Affected Resource/Habitat Type:

a. Trees

Verify that all tree removal occurs greater than 0.5 mile from any hibernaculum:

Verify that the project is within 100 feet of existing road/rail surfaces:

Verify that no documented Indiana bat and/or NLEB roosts and/or surrounding summer habitat within 0.25 mile of documented roosts will be impacted: ☐

Verify that all tree removal will occur outside the active season (i.e., will occur in winter)²:

Acres of trees proposed for removal:

b. Bridge/Structure Work Projects

Proposed work:

Timing of work:

Evidence of bat activity on/in bridge/structure? Y/N

Verify that work will be conducted outside the active season, or if during the active season, verify that no roosting bats will be harmed or disturbed in any way:

Verify that work will not alter roosting potential in any way:

Verify that all applicable lighting minimization measures will be implemented: ☐

c. Other (please explain)

² Coordinate with the local Service Field Office for appropriate dates.

MAY AFFECT, LIKELY TO ADVERSELY AFFECT

12. For Indiana bat/NLEB, if applicable, document your may affect, LAA determination by completing the following section (use #13 to document AMMs).

Affected Resource/Habitat Type:

a. Trees

Verify that all tree removal occurs greater than 0.5 mile from any hibernaculum: ☒

Project Location:

0-100 feet from edge of existing road/rail surface

☒

100-300 feet from edge of existing road/rail surface

☐

Verify that no documented Indiana bat roosts or surrounding summer habitat within 0.25 mile of documented roosts will be impacted between May 1 and July 31: ☒

Verify that no documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted between June 1 and July 31: ☒

Timing of tree removal: Spring - Summer 2018

Acres of trees proposed for removal: <<0.1 acres (2 trees)

b. Bridge/Structure Work Projects

Proposed work: Bridge rehabilitation - localized repairs

Timing of work: Spring - Summer 2018

Verify no signs of a colony: ☒

Verify that work will not alter roosting potential in any way: ☒

13. For Indiana bat/NLEB, **if applicable to the action type**, the following AMMs will be implemented³ unless P/A surveys and/or bridge assessments document that the species are not likely to be present:

General AMM 1(required for all projects):

³ See AMMs Fact Sheet (Appendix C) for more information on AMMs

Tree Removal AMM 1: ☒
 Tree Removal AMM 2 (required for NLAA): ☐
 Tree Removal AMM 3 (required for all projects): ☒
 Tree Removal AMM 4 (required for NLAA): ☒
 Tree Removal AMM 5 (required for LAA): ☐ n/a - no Indiana bat
 Tree Removal AMM 6 (required for LAA): ☐ n/a - no Indiana bat

Tree Removal AMM 7 (required for LAA): ☒

Bridge AMM 1: ☐
 Bridge AMM 2 (required for all projects during active season): ☒
 Bridge AMM 3 (required for NLAA during active season): ☐
 Bridge AMM 4 (required for NLAA during active season): ☐
 Bridge AMM 5 (required for all projects): ☒

Structure AMM 1 (required for all Indiana bat projects, required for NLAA NLEB projects): ☐
 Structure AMM 2 (required for all Indiana bat projects, required for NLAA NLEB projects): ☐
 Structure AMM 3 (required for all Indiana bat projects, required for NLAA NLEB projects): ☐
 Structure AMM 4 (required for all Indiana bat projects, required for NLAA NLEB projects): ☐

Lighting AMM 1 (required for all projects during the active season): ☒
 Lighting AMM 2 (required for all projects): ☐ n/a - no permanent lighting

Hibernacula AMM 1 (required for all projects): ☐ n/a - no karst geology.

14. For Indiana bat, if applicable, compensatory mitigation measures will also be required to offset adverse effects on the species (see Section 2.10 of the BA). Please verify the mechanism in which compensatory mitigation will be implemented and that sufficient information is provided to the Service.

Range-wide In Lieu Fee Program, The Conservation Fund ☐

State, Regional, Recovery Unit-Specific In Lieu Fee Program
 Name:

Conservation Bank,
 Name:
 Location:

Local Conservation Site(s)
 Name:
 Location:
 Description:

Bridge/Structure Assessment Form

This form will be completed and submitted to the District Environmental Manager by the Contractor prior to conducting any work below the deck surface either from the underside, from activities above that bore down to the underside, or that could impact expansion joints, from deck removal on bridges, or from structure demolish. Each bridge/structure to be worked on must have a current bridge inspection. Any bridge/structure suspected of providing habitat for any species of bat will be removed from work schedules until such time that the DOT has obtained clearance from the US Fish and Wildlife Service, if required. Additional studies may be undertaken by the DOT to determine what species may be utilizing structures prior to allowing any work to proceed.

DOT Project # 16154	Water Body Salmon Brook	Date/Time of Inspection October 8, 2015; 9:00 AM - 2:00 PM
-------------------------------	-----------------------------------	--

Route:	County:	Federal Structure ID:	Bat Indicators Check all that apply. Presence of one or more indicators is sufficient evidence that bats may be using the structure.				
			Visual	Sound	Droppings	Staining	Notes: (e.g., number & species of bats, if known. Include the results of thermal, emergent, or presence/absence summer survey)
I-93	Belknap	124/096					No visible evidence of bat activity or roosting habitat.
							No girders, crevices, or openings available for roosting.

Areas Inspected (Check all that apply)

Bridges		Culverts/Other Structures		Summary Info (circle all that apply)			
All vertical crevices sealed at the top and 0.5-1.25" wide & ≥4" deep	✓	Crevices, rough surfaces or imperfections in concrete		Human disturbance or traffic under bridge/in culvert or at the structure	High	Low	None

All crevices >12" deep & not sealed	N/A	Spaces between walls, ceiling joists		Possible corridors for netting	None/poor	Marginal	Excellent
All guardrails	N/A			Evidence of bats using bird nests, if present?	Yes	No	
All expansion joints	✓						
Spaces between concrete end walls and the bridge deck	N/A						
Vertical surfaces on concrete I-beams	N/A						

*Desktop review of bridge inspection photos.

Assessment Conducted By: <u>Lindsay Jones, VHB</u> Signature(s): _____
District Environmental Use Only: Date Received by District Environmental Manager: _____

DOT Bat Assessment Form Instructions

1. Assessments must be completed a minimum of 1 year prior to conducting any work below the deck surface on all bridges that meet the physical characteristics described in the Programmatic Consultation, regardless of whether assessments have been conducted in the past. **Due to the transitory nature of bat use, a negative result in one year does not guarantee that bats will not use that structure in subsequent years.**
2. Any bridge/structure suspected of providing habitat for any species of bat will be removed from work schedules until such time that the DOT has obtained clearance from the USFWS, if required. Additional studies may be undertaken by the DOT to determine what species may be utilizing each structure identified as supporting bats prior to allowing any work to proceed.
3. Estimates of numbers of bats observed should be place in the Notes column.
4. Any questions should be directed to the District Environmental Manager.

Bridge/Structure Assessment Form

This form will be completed and submitted to the District Environmental Manager by the Contractor prior to conducting any work below the deck surface either from the underside, from activities above that bore down to the underside, or that could impact expansion joints, from deck removal on bridges, or from structure demolish. Each bridge/structure to be worked on must have a current bridge inspection. Any bridge/structure suspected of providing habitat for any species of bat will be removed from work schedules until such time that the DOT has obtained clearance from the US Fish and Wildlife Service, if required. Additional studies may be undertaken by the DOT to determine what species may be utilizing structures prior to allowing any work to proceed.

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Route:	County:	Federal Structure ID:	Bat Indicators Check all that apply. Presence of one or more indicators is sufficient evidence that bats may be using the structure.				
			Visual	Sound	Droppings	Staining	Notes: (e.g., number & species of bats, if known. Include the results of thermal, emergent, or presence/absence summer survey)
I-93	Belknap	127/099					No visible evidence of bat activity or roosting habitat.

Areas Inspected (Check all that apply)

Bridges		Culverts/Other Structures		Summary Info (circle all that apply)			
All vertical crevices sealed at the top and 0.5-1.25" wide & ≥4" deep	✓	Crevices, rough surfaces or imperfections in concrete		Human disturbance or traffic under bridge/in culvert or at the structure	High	Low	None

All crevices >12" deep & not sealed	✓	Spaces between walls, ceiling joists		Possible corridors for netting	None/poor	Marginal	Excellent
All guardrails	N/A			Evidence of bats using bird nests, if present?	Yes	No	
All expansion joints	✓						
Spaces between concrete end walls and the bridge deck	N/A						
Vertical surfaces on concrete I-beams	N/A						

*Desktop review of bridge inspection photos.

Assessment Conducted By: Lindsay Jones, VHB Signature(s): _____

District Environmental Use Only: Date Received by District Environmental Manager: _____

DOT Bat Assessment Form Instructions

1. Assessments must be completed a minimum of 1 year prior to conducting any work below the deck surface on all bridges that meet the physical characteristics described in the Programmatic Consultation, regardless of whether assessments have been conducted in the past. **Due to the transitory nature of bat use, a negative result in one year does not guarantee that bats will not use that structure in subsequent years.**
2. Any bridge/structure suspected of providing habitat for any species of bat will be removed from work schedules until such time that the DOT has obtained clearance from the USFWS, if required. Additional studies may be undertaken by the DOT to determine what species may be utilizing each structure identified as supporting bats prior to allowing any work to proceed.
3. Estimates of numbers of bats observed should be place in the Notes column.
4. Any questions should be directed to the District Environmental Manager.

Bridge Assessment Photographs – October 8, 2015
NHDOT Bridges #127/099 and #124/096; I-93 over Salmon Brook
Sanbornton, NH



Photo 1: View downstream of bridge #127/099 (northbound bridge) looking east.



Photo 2: View underneath bridge #127/099 along the separation of the center culvert joint. This crack is more than 24 inches deep, and will be repaired as part of the proposed project.

Bridge Assessment Photographs – October 8, 2015
NHDOT Bridges #127/099 and #124/096; I-93 over Salmon Brook
Sanbornton, NH



Photo 3: View underneath bridge #127/099 along the separation of the center culvert joint, to be repaired. Note lack of roosting space other than expansion joint.



Photo 4: View of the separation of the center culvert joint of bridge #127/099 – crack is approximately 2 ft. deep.

Bridge Assessment Photographs – October 8, 2015
NHDOT Bridges #127/099 and #124/096; I-93 over Salmon Brook
Sanbornton, NH



Photo 5: View of the spall on the culvert roof of bridge #127/099, to be repaired.



Photo 6: View of separation along the west wingwall of bridge #127/099, to be repaired.

Bridge Assessment Photographs – October 8, 2015
NHDOT Bridges #127/099 and #124/096; I-93 over Salmon Brook
Sanbornton, NH



Photo 7: General view of the underside of bridge #127/099.



Photo 8: General view inside bridge #124/096 (southbound bridge). No work is proposed within this structure. Note also the lack of roosting opportunities inside this structure.

Bridge Assessment Photographs – October 8, 2015
NHDOT Bridges #127/099 and #124/096; I-93 over Salmon Brook
Sanbornton, NH



Photo 9: View of the spill along the eastern end of the south wall of bridge #124/096, to be repaired.



Photo 10: View of areas of delamination on the culvert roof of bridge #124/096, to be repaired.



United States Department of the Interior

FISH AND WILDLIFE SERVICE



New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
<http://www.fws.gov/newengland>

RE: Repairs to bridges #127/099 and #124/099 over Salmon Brook,
Sanbornton, New Hampshire (05E1NE00-2016-F-0858)

February 28, 2017

Rebecca Martin
NH DOT Bureau of Environment
7 Hazen Drive
Concord, NH 03301

Dear Ms. Martin:

The U.S. Fish and Wildlife Service (Service) is responding to your Project Submittal Form, dated November 3, 2016, and received in our office on January 6, 2017, to verify that the proposed repairs to bridges #127/099 and #124/099 over Salmon Brook in Sanbornton, New Hampshire (Project) may rely on the May 20, 2016, Programmatic Biological Opinion (BO) for federally funded or approved transportation projects that may affect the northern long-eared bat (NLEB) (*Myotis septentrionalis*). This letter provides the Service's response as to whether the Project may rely on the BO to comply with section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) for its effects to the NLEB.

The New Hampshire Department of Transportation's (NHDOT) proposed repairs to the two bridges include concrete reconstruction of the roof slab, grouting two wingwall joints and patching areas along the roof slab and walls (northbound bridge), and repairs to spalled and delaminated concrete on the roof slab and southeast wingwall (southbound bridge). NHDOT, as the non-Federal agency representative for the Federal Highway Administration, determined that the Project is *likely to adversely affect* the NLEB, because the proposed action may affect two trees potentially occupied by NLEBs during the active season. NHDOT also determined the Project may rely on the programmatic BO to comply with section 7(a)(2) of the ESA, because the Project meets the conditions outlined in the BO and all tree clearing related to the proposed roadwork will occur farther than 0.25 mile from documented roosts and farther than 0.5 mile from any hibernacula. The Service reviewed the Project Submittal Form and concurs with NHDOT's determination. This concurrence concludes your ESA section 7 responsibilities relative to this species for this Project, subject to the Reinitiation Notice below.

Conclusion

The Service has reviewed the effects of the proposed Project, which includes the NHDOT's commitment to implement the impact avoidance, minimization, and compensation measures as indicated on the Project Submittal Form. We confirm that the proposed Project's effects are consistent with those analyzed in the BO. The Service has determined that the Project is consistent with the BO's conservation measures, and the scope of the program analyzed in the BO is not likely to jeopardize the continued existence of the NLEB. In coordination with your agency, the Federal Highway Administration, and the other sponsoring Federal Transportation Agencies, the Service will reevaluate this conclusion annually in light of any new pertinent information under the adaptive management provisions of the BO.

Incidental Take of the Northern Long-eared Bat

The Service anticipates that tree removal associated with the proposed Project will cause incidental take of the NLEB. However, the Project is consistent with the BO, and such projects will not cause take of NLEBs that is prohibited under the final 4(d) rule for this species (50 CFR §17.40(o)). Therefore, this taking does not require exemption from the Service.

Reporting Dead or Injured Bats

The NHDOT, the Federal Highway Administration, its State/local cooperators, and any contractors must take care when handling dead or injured NLEBs that are found at the project site, in order to preserve biological material in the best possible condition and to protect the handler from exposure to diseases, such as rabies. Project personnel are responsible for ensuring that any evidence about determining the cause of death or injury is not unnecessarily disturbed. Reporting the discovery of dead or injured listed species is required in all cases to enable the Service to determine whether the level of incidental take exempted by this BO is exceeded, and to ensure that the terms and conditions are appropriate and effective. Parties finding a dead, injured, or sick specimen of any endangered or threatened species must promptly notify the Service's New England Field Office.

Reinitiation Notice

This letter concludes consultation for the proposed Project, which qualifies for inclusion in the BO issued to the Federal Transportation Agencies. To maintain this inclusion, a reinitiation of this project-level consultation is required where the Federal Highway Administration's discretionary involvement or control over the Project has been retained (or is authorized by law) and if:

1. new information reveals that the Project may affect listed species or critical habitat in a manner or to an extent not considered in the BO;
2. the Project is subsequently modified in a manner that causes an effect to listed species or designated critical habitat not considered in the BO; or
3. a new species is listed or critical habitat designated that the Project may affect.

Rebecca Martin
February 28, 2017

3

In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate your continued efforts to ensure that this Project is fully consistent with all applicable provisions of the BO. If you have any questions regarding our response, or if you need additional information, please contact Susi von Oettingen of this office at 603-227-6418.

Sincerely yours,

A handwritten signature in blue ink, appearing to read "D. Smith", is written over a horizontal line.

acting for
Thomas R. Chapman
Supervisor
New England Field Office

Appendix I

NHDHR Effect Memo and NHDOT Cultural Resources Review



Appendix B Certification – Projects with Minimal Potential to Cause Effects

Date Reviewed: 11/7/2016

Project Name: Sanbornton Bridges #127/099
and #124/096, I-93 Over
Salmon Brook

State Number: 16154

FHWA Number: X-A001(158)

Environmental Contact: Ron Crickard
Email Address: rcrickard@dot.state.nh.us

DOT
Project Manager: Robert Landry

Project Description: *The project involves repair of NHDOT Bridges #127/099 and #124/096 which carry Interstate 93 northbound and southbound, respectively, over Salmon Brook in Sanbornton. Repairs along the northbound bridge include full-depth concrete reconstruction along the center joint of the roof slab, grouting two wingwall joints, and patching or crack-filling areas along the roof slab and walls. The southbound bridge includes repairs in localized areas of spalled and delaminated concrete on the roof slab and southeast wingwall.*

Please select the applicable undertaking type(s):

<input type="checkbox"/>	1. Modernization and general highway maintenance <u>that may require additional highway right-of-way or easement</u> , and which is <u>not within the boundaries of a historic property or district</u> , including:
	Choose an item.
	Choose an item.
<input checked="" type="checkbox"/>	2. Non-historic bridge and culvert maintenance, renovation, or total replacement, <u>that may require minor additional right-of-way or easement</u> , and which is <u>not within the boundaries of a historic property or district</u> , including:
	b. replacement or maintenance of non-historic bridges
	Choose an item.
<input type="checkbox"/>	3. Historic bridge maintenance activities within the limits of existing right-of-way, including:
	Choose an item.
	Choose an item.
<input type="checkbox"/>	4. Stream stabilization and restoration activities (including removal of debris or sediment obstructing the natural waterway, or any non-invasive action to restore natural conditions).
<input type="checkbox"/>	5. Construction of bicycle lanes and pedestrian walkways, sidewalks, shared-use paths and facilities, small passenger shelters, and alterations to facilities or vehicles in order to make them accessible for elderly and handicapped persons, <u>not within the boundaries of a historic property or district</u> .
<input type="checkbox"/>	6. Installation of bicycle racks, <u>not within the boundaries of a historic property or district</u> .
<input type="checkbox"/>	7. Recreational trail construction, <u>not within the boundaries of a historic property or district</u> .
<input type="checkbox"/>	8. Recreational trail maintenance when done on existing alignment.
<input type="checkbox"/>	9. Modernization, maintenance, and safety improvements of railroad facilities within the existing railroad or highway right-of-way, <u>not within the boundaries of a historic property or district, and no historic railroad features are impacted</u> , including, but not limited to:
	Choose an item.
	Choose an item.
<input type="checkbox"/>	10. Acquisition or renewal of scenic, conservation, habitat, or other land preservation easements
<input type="checkbox"/>	11. Installation of Intelligent Transportation Systems.

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Projects with Minimal Potential to Cause Effects

Please describe how this project is applicable under Appendix B of the Programmatic Agreement.

The project proposes minor maintenance activities on two bridges, with no changes in their structure or appearance. The bridges are not on the Final List of Nationally and Exceptionally Significant Features of the Federal Interstate Highway System and are therefore not subject to Section 106 or Section 4(f) review. Additionally, there are no anticipated impacts outside the current roadway disturbance that would require archaeological survey.



NHDOT in-house projects: Please append photographs, USGS maps, design plans and as-built plans, if available, for review.

LPA projects: Please submit this Certification Form along with the Transportation RPR

Coordination Efforts:

Has an RPR been submitted to NHDOT for this project?	Yes	NHDHR R&C # assigned?	No
Please identify public outreach effort contacts; method of outreach and date:	A Natural Resource Agency Coordination Meeting was held on October 19, 2016. A Public Officials/Stakeholder Meeting is planned for Winter 2016-2017.		

Finding: (To be filled out by NHDOT Cultural Resources Staff)

<input type="checkbox"/>	No Potential to Cause Effects	<input checked="" type="checkbox"/>	No Historic Properties Affected
This finding serves as the Section 106 Memorandum for your environmental documents, no further coordination is necessary.			
<input type="checkbox"/>	This project does <i>not</i> comply with Appendix B, and will continue under the Section 106 review process outlined in 36 CFR 800.3-800.7. Please contact NHDOT Cultural Resources Staff to determine next steps.		
NHDOT comments:			
 NHDOT Cultural Resources Staff		 Date	

Coordination of the Section 106 process should begin as early as possible in the planning phase of the project (undertaking) so as not to cause a delay.

Project sponsors should not predetermine a Section 106 finding under the assumption that an undertaking conforms to the types listed in Appendix B until this form is signed by the NHDOT Bureau of Environment Cultural Resources Program staff.

Every project shall be coordinated with, and reviewed by the NHDOT-BOE Cultural Resources Program in accordance with the Cultural Resources Programmatic Agreement among the Advisory Council on Historic Preservation, Federal Highway Administration, NH Department of Transportation, and the State Historic Preservation Office. In accordance with the Advisory Council's regulations, we will continue to consult, as appropriate, as this project proceeds.

If any portion of the undertaking is not entirely limited to any one or a combination of the types specified in Appendix B (with, or without a portion that is included as a type listed in Appendix A), please continue discussions with NHDOT Cultural Resources staff.

This No Potential to Cause Effect or No Historic Properties Affected project determination is your Section 106 finding, as defined in the Programmatic Agreement.

Should project plans change, please inform the NHDOT Cultural Resources staff in accordance with Stipulation VII of the Programmatic Agreement.

Appendix J

ACOE Programmatic General Permit – Appendix B





**US Army Corps
of Engineers®**
New England District

**New Hampshire Programmatic General Permit (PGP)
Appendix B - Corps Secondary Impacts Checklist
(for inland wetland/waterway fill projects in New Hampshire)**

1. Attach any explanations to this checklist. Lack of information could delay a Corps permit determination.
2. All references to “work” include all work associated with the project construction and operation. Work includes filling, clearing, flooding, draining, excavation, dozing, stumping, etc.
3. See PGP, GC 5, regarding single and complete projects.
4. Contact the Corps at (978) 318-8832 with any questions.

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*	X ¹	
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	X ²	
2.2 Are there proposed impacts to SAS, shellfish beds, special wetlands and vernal pools (see PGP, GC 26 and Appendix A)? Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) website, www.nhnaturalheritage.org , specifically the book Natural Community Systems of New Hampshire .		X
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	X ³	
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)		X
2.5 The overall project site is more than 40 acres.		X
2.6 What is the size of the existing impervious surface area?	N/A	
2.7 What is the size of the proposed impervious surface area?	N/A	
2.8 What is the % of the impervious area (new and existing) to the overall project site?	N/A	
3. Wildlife	Yes	No
3.1 Has the NHB determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require a NHB determination.)		X ⁴
3.2 Would work occur in any area identified as either “Highest Ranked Habitat in N.H.” or “Highest Ranked Habitat in Ecological Region”? (These areas are colored magenta and green, respectively, on NH Fish and Game’s map, “2010 Highest Ranked Wildlife Habitat by Ecological Condition.”) Map information can be found at: <ul style="list-style-type: none"> • PDF: www.wildlife.state.nh.us/Wildlife/Plan/highest_ranking_habitat.htm. • Data Mapper: www.granit.unh.edu. • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html. 		X

3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		X
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		X
3.5 Are stream crossings designed in accordance with the PGP, GC 21?	X ⁵	
4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?	X	
4.2 If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage?		X ⁶
5. Historic/Archaeological Resources		
For a minor or major impact project - a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) shall be sent to the NH Division of Historical Resources as required on Page 5 of the PGP**	X ⁷	

*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.

** If project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law..

1. Salmon Brook is listed as an impaired water in accordance with Section 303(d) of the Clean Water Act. Salmon Brook's waterbody ID is NHRIV70010802-07, and the cause for impairment is mercury and *Eschericia coli*, mainly impacting aquatic life and swimming activities. The proposed repairs to Bridge #127/099 and #124/096 will have negligible effects on the water quality of the brook as the repairs are confined to the bridge structures themselves.

2. The proposed project occurs along Bridges #127/099 and #124/096 which carries I-93 northbound and southbound over Salmon Brook. Further information regarding the location of the proposed work can be found in the Wetland Impact Plans in Appendix Q.

3. The bridge rehabilitation for Bridges #127/099 and #124/096 will be in compliance with the standards outlined in the NH Stream Crossing Guidelines (May 2009) document by the University of New Hampshire, with the exception of the existing width of the structure for both bridges and the closed-bottom structure of Bridge #127/099. Further information can be found in Section 6.0 of the Supplemental Narrative of the NHDES Wetlands Permit Application.

4. A search for the occurrence of rare plant, animal, or natural communities within the vicinity of the proposed project was completed using the NH Natural Heritage Bureau's (NHB) online Datacheck tool. A project report provided by NHB, dated January 16, 2017, indicated that there are no recorded occurrences for sensitive species near the project area. No further consultation within NHB is required at this time.

5. The existing bridge structures are to be retained. The proposed rehabilitation only involves surficial repairs to the underside of the bridge structure. No additional modifications to the bridge structure are proposed. The existing opening and bridge structures are adequate and accomodates the full bankfull condition of Salmon Brook.

6. The floodplain of Salmon Brook is not anticipated to be impacted by the proposed project. Wetland impacts are limited to the temporary use of cofferdams within the brook. There would be no change in grading within the floodplain and the existing hydraulic opening would remain the same, therefore compensatory flood storage is not warranted.

7. A Section 106 Programmatic Agreement Appendix B Certification form was completed for the proposed project by NHDOT. Upon review of the proposed project by NHDOT Cultural Resource Staff, it was determined that the project has a finding of No Historic Properties Affected. No further coordination with the NH Division of Historical Resources is necessary.

Appendix K

Representative Site Photos



Representative Site Photographs
NHDOT Bridges #127/099 and #124/096; I-93 NB and SB over Salmon Brook
Sanbornton, NH



Photo 1: View of Salmon Brook looking west toward the I-93 NB crossing. Grass lawn associated with property on Tax Map 15 Lot 36 visible to right of photo. 05/20/2016.



Photo 2: View west of Salmon Brook passing under the I-93 NB crossing. 05/20/2016.

Representative Site Photographs
NHDOT Bridges #127/099 and #124/096; I-93 NB and SB over Salmon Brook
Sanbornton, NH



Photo 3: View north at intermittent stream channel bordered by PSS1E wetland along the north side of Salmon Brook, east of the I-93 NB crossing. 05/20/2016.



Photo 4: View east of Salmon Brook from the I-93 NB crossing. 05/20/2016.

Representative Site Photographs
NHDOT Bridges #127/099 and #124/096; I-93 NB and SB over Salmon Brook
Sanbornton, NH



Photo 5: View northeast at PSS1C wetland bordering the northern bank of Salmon Brook, east of the I-93 NB crossing. 05/20/2016.



Photo 6: View north at PFO1E wetland located to the south of Salmon Brook and east of the I-93 NB crossing. 11/13/2015.

Representative Site Photographs
NHDOT Bridges #127/099 and #124/096; I-93 NB and SB over Salmon Brook
Sanbornton, NH



Photo 7: View west of Salmon Brook from the I-93 NB bridge. 05/20/2016.



Photo 8: View west at PSS/EM1E wetland bordering the north side of Salmon Brook west of the I-93 NB crossing. 05/20/2016.

Representative Site Photographs
NHDOT Bridges #127/099 and #124/096; I-93 NB and SB over Salmon Brook
Sanbornton, NH



Photo 9: View southeast of Salmon Brook passing under the I-93 NB crossing. 05/20/2016.



Photo 10: View north at sinuous perennial tributary draining to Salmon Brook along the northern side of Salmon Brook outside of the limits of the study area. 05/20/2016.

Representative Site Photographs
NHDOT Bridges #127/099 and #124/096; I-93 NB and SB over Salmon Brook
Sanbornton, NH



Photo 11: View of Salmon Brook looking east toward the I-93 NB crossing. 05/20/2016.

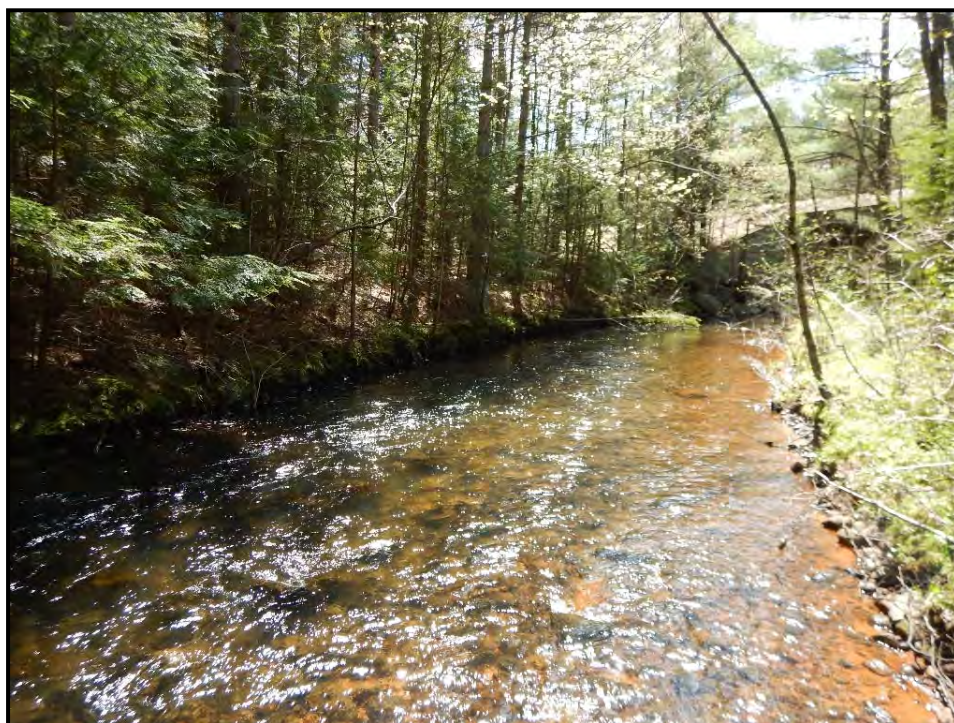


Photo 12: View of Salmon Brook looking west toward the I-93 SB crossing. 05/20/2016.

Representative Site Photographs
NHDOT Bridges #127/099 and #124/096; I-93 NB and SB over Salmon Brook
Sanbornton, NH



Photo 13: View west of Salmon Brook passing under the I-93 SB crossing. 05/20/2016.



Photo 14: View east of Salmon Brook from the I-93 SB crossing. 05/20/2016.

Representative Site Photographs
NHDOT Bridges #127/099 and #124/096; I-93 NB and SB over Salmon Brook
Sanbornton, NH



Photo 15: View southeast of Salmon Brook passing under the I-93 southbound crossing. 05/20/2016.

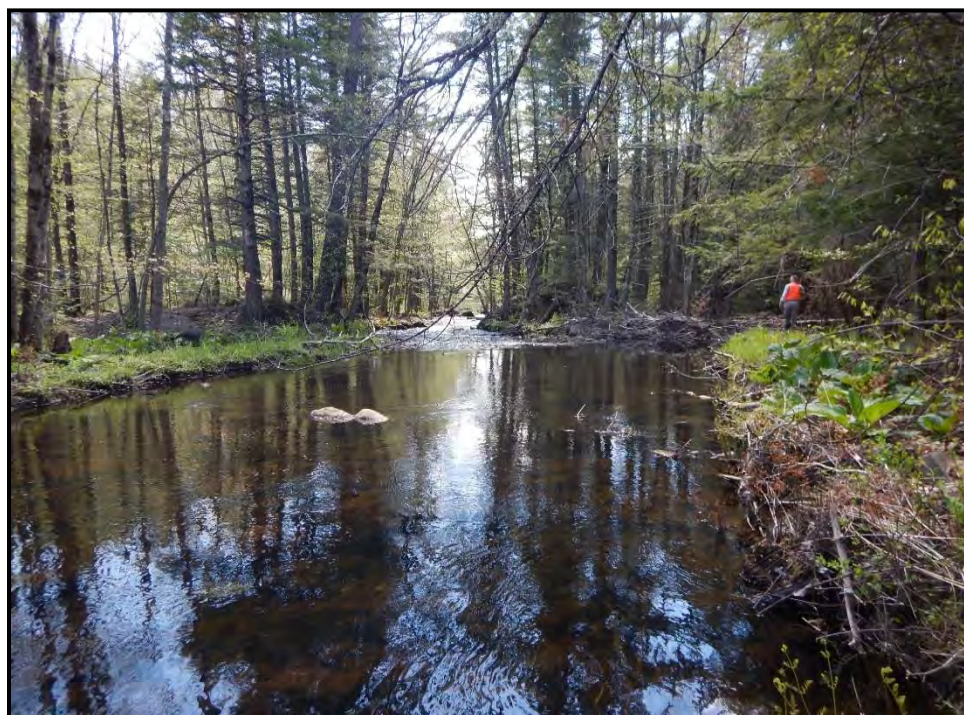


Photo 16: View southwest of Salmon Brook from the I-93 SB crossing. 05/20/2016.

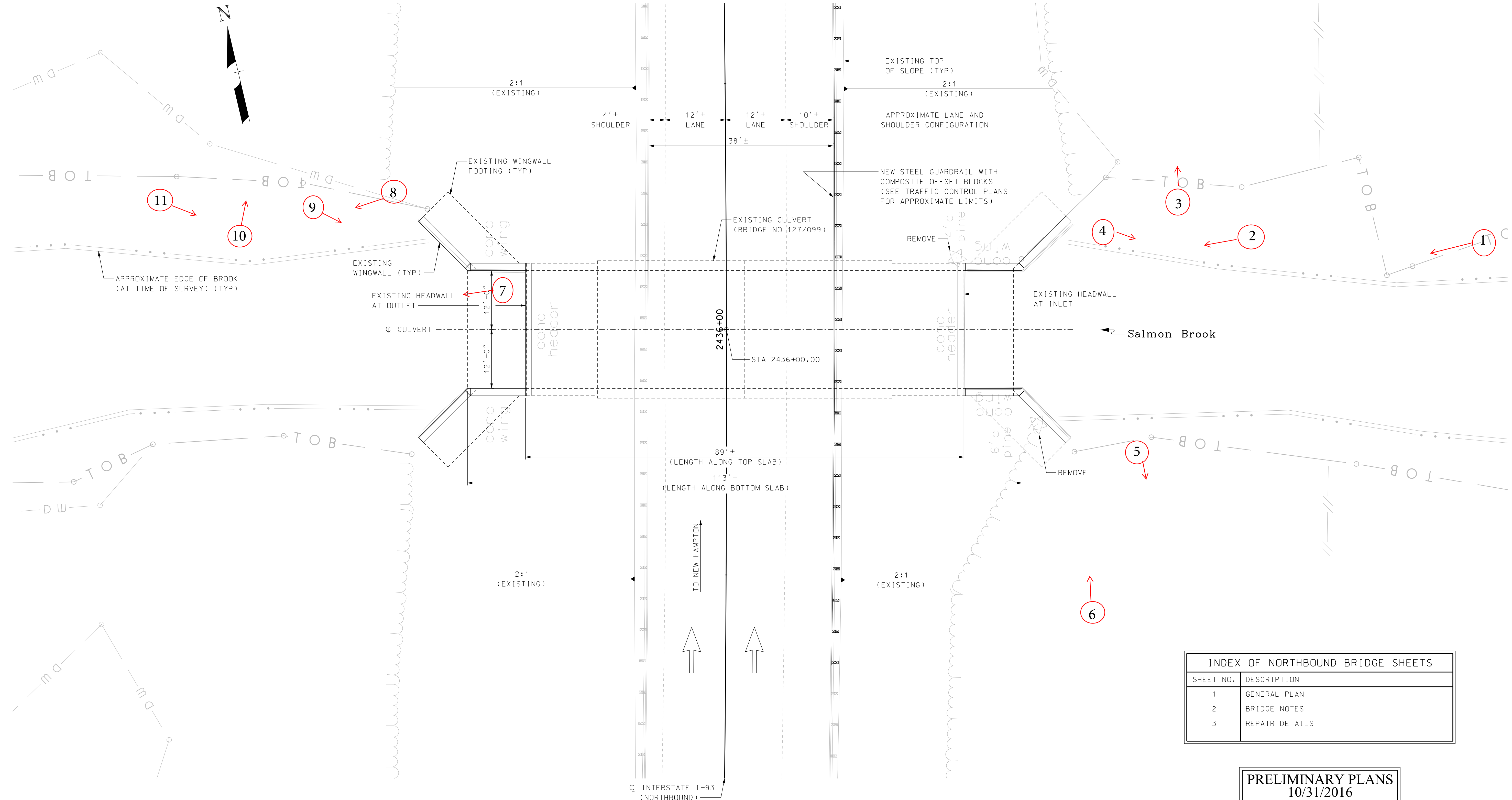
Representative Site Photographs
NHDOT Bridges #127/099 and #124/096; I-93 NB and SB over Salmon Brook
Sanbornton, NH



Photo 17: View south of an intermittent channel draining to Salmon Brook to the north of the brook and west of the I-93 SB crossing. 11/13/2015.



Photo 18: View of Salmon Brook looking east toward the I-93 SB crossing. 05/20/2016.



INDEX OF NORTHBOUND BRIDGE SHEETS	
SHEET NO.	DESCRIPTION
1	GENERAL PLAN
2	BRIDGE NOTES
3	REPAIR DETAILS

PRELIMINARY PLANS
10/31/2016
SUBJECT TO CHANGE

HYDRAULIC DATA	
DRAINAGE AREA *	17.2 SQ. MILES
DESIGN FLOOD DISCHARGE (100 YR) *	1,500 CFS
DESIGN FLOOD ELEVATION (100 YR) DEPTH (100 YR)	8± FEET
DESIGN FLOOD VELOCITY (100 YR) *	2-3 FPS
BRIDGE FULL WATERWAY OPENING PERPENDICULAR TO RIVER	384 SQ. FEET

* FROM EFFECTIVE FLOOD INSURANCE STUDY FOR THE TOWN OF SANBORNTON (DECEMBER 1978).

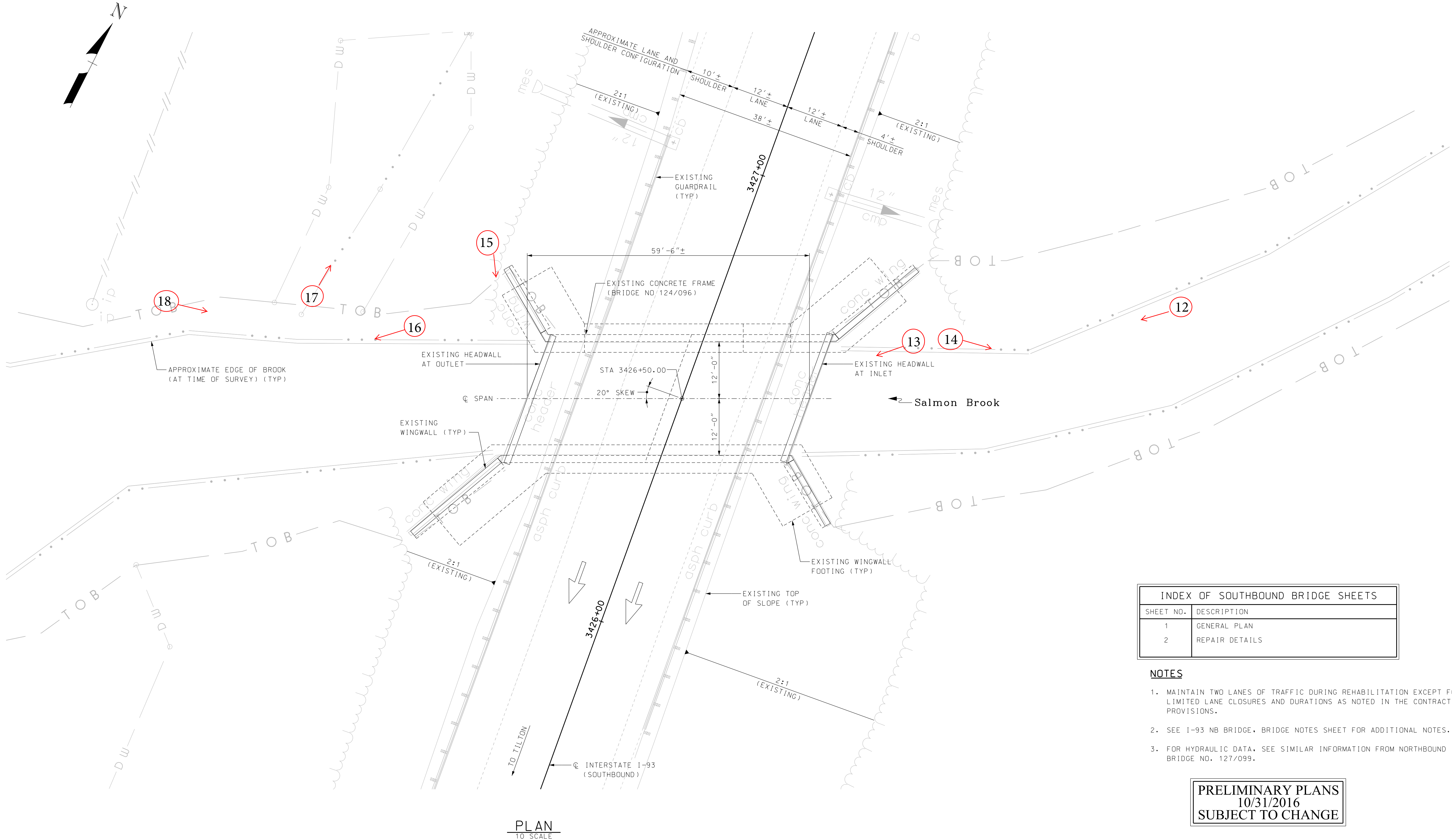
PLAN
10 SCALE

Photo Location Map



PLOT DATE	DRAWING NAME	SHEET SCALE
10/31/2016	16154nb_gp.dgn	AS NOTED

STATE OF NEW HAMPSHIRE										
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN										
TOWN SANBORNTON			BRIDGE NO. 127/099				STATE PROJECT 16154			
LOCATION I-93 NB OVER SALMON BROOK										
GENERAL PLAN								BRIDGE SHEET		
REVISIONS AFTER PROPOSAL			BY		DATE		BY		DATE	
			DESIGNED		KCD 10/16		CHECKED		SMH 10/16	
			DRAWN		KDW 10/16		CHECKED		KCD 10/16	
			QUANTITIES				CHECKED			
			ISSUE DATE			FEDERAL PROJECT NO.			SHEET NO.	
			REV. DATE						6	
									TOTAL SHEETS	
									12	



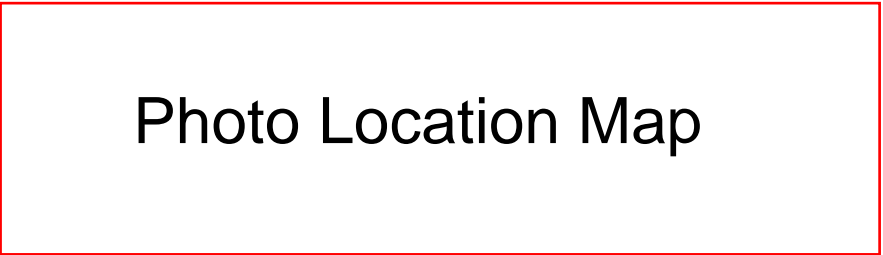
INDEX OF SOUTHBOUND BRIDGE SHEETS	
SHEET NO.	DESCRIPTION
1	GENERAL PLAN
2	REPAIR DETAILS

NOTES

1. MAINTAIN TWO LANES OF TRAFFIC DURING REHABILITATION EXCEPT FOR LIMITED LANE CLOSURES AND DURATIONS AS NOTED IN THE CONTRACT PROVISIONS.
2. SEE I-93 NB BRIDGE, BRIDGE NOTES SHEET FOR ADDITIONAL NOTES.
3. FOR HYDRAULIC DATA, SEE SIMILAR INFORMATION FROM NORTHBOUND BRIDGE NO. 127/099.

PRELIMINARY PLANS
10/31/2016
SUBJECT TO CHANGE

PLAN
10' SCALE



PLOT DATE	DRAWING NAME	SHEET SCALE
10/31/2016	16154sb_gp.dgn	AS NOTED

STATE OF NEW HAMPSHIRE										
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN										
TOWN SANBORNTON			BRIDGE NO. 124/096				STATE PROJECT 16154			
LOCATION I-93 SB OVER SALMON BROOK										
GENERAL PLAN								BRIDGE SHEET		
REVISIONS AFTER PROPOSAL			BY		DATE		BY		DATE	
			DESIGNED		KCD 10/16		CHECKED		SMH 10/16	
			DRAWN		KDW 10/16		CHECKED		KCD 10/16	
			QUANTITIES				CHECKED			
			ISSUE DATE				FEDERAL PROJECT NO.		SHEET NO.	
			REV. DATE						9	
									TOTAL SHEETS 12	

Appendix L

Construction Sequence Narrative





Construction Sequence

1. The Contractor shall install traffic control devices and any necessary temporary erosion and turbidity control measures prior to construction to protect the water quality of Salmon Brook.
2. The guardrail and curb along the east side of Bridge No. 127/099 may be removed as required to allow access for the Contractor to conduct repairs.
3. Phased cofferdams are required to be installed on the north and south sides for concrete repairs at Bridge No. 127/099. Cofferdams shall be installed one side at a time to maintain and maximize channel flow area while completing repairs.
4. Work on Bridge No. 124/096 may occur concurrently with work on Bridge No. 127/099. All work is anticipated to be performed within an 8-week period.
5. New bituminous curb and guardrail along the east side of I-93 at Bridge No. 127/099 will be installed.
6. If construction activity is planned during the active season of the Northern Long-eared Bat, (April 1st through October 31st), perform a final inspection of the bridge no more than 7 days prior to the start of construction activity to ensure bats have not started to use the area of the bridge proposed for work after the original inspection.
7. Though unlikely to be present within the project limits, the involved parties shall promptly notify the US Fish and Wildlife Service Concord Field Office upon finding a dead, injured, or sick Northern Long-eared Bat.
8. Remove all vegetation from equipment before leaving the site to reduce the risk of transporting invasive species (glossy buckthorn) from the site.
9. Traffic control measures will be removed after completion and acceptance of the work.

Appendix M

Env-Wt 404 Rip-Rap

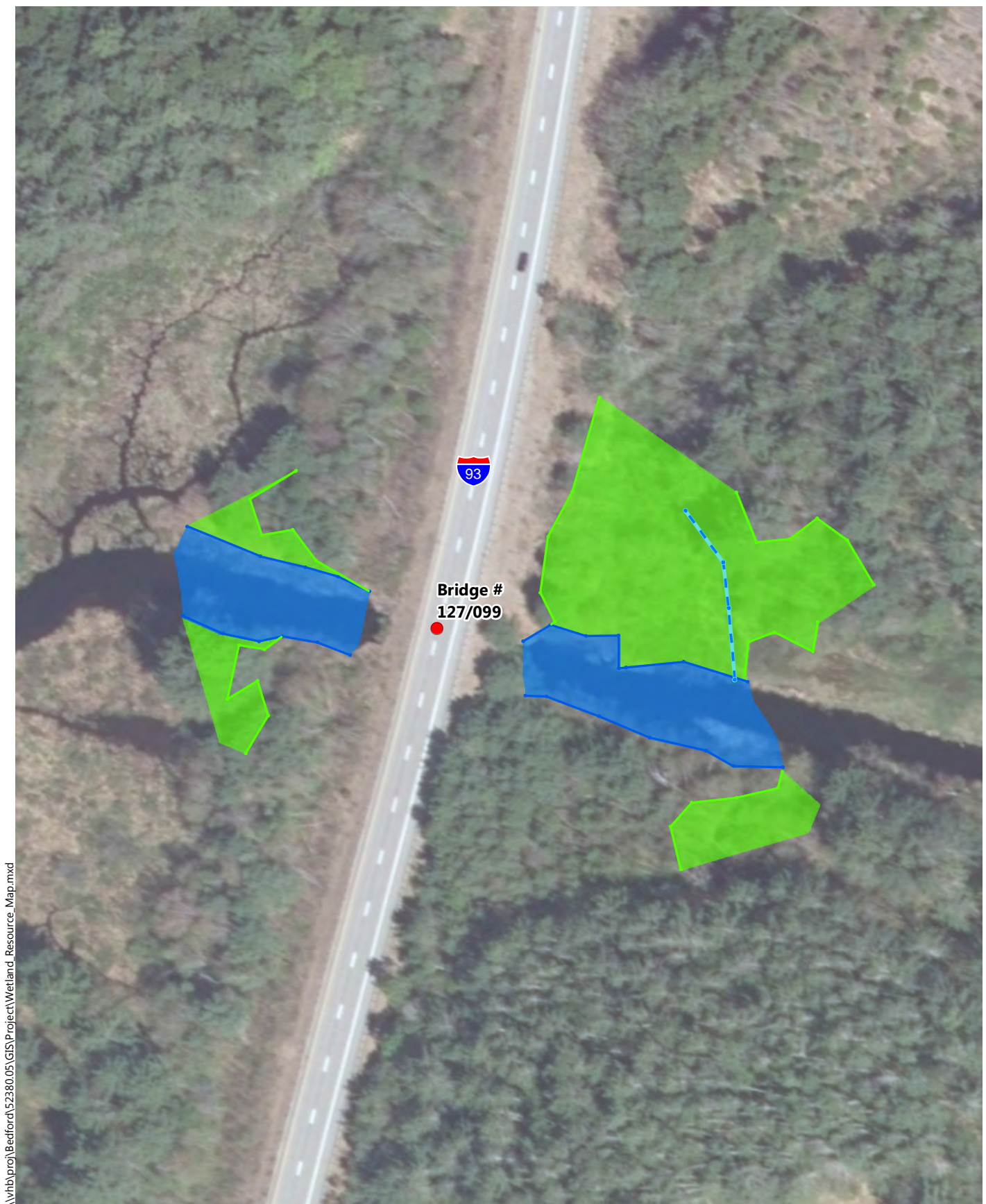


Not Applicable

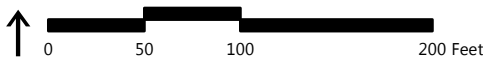
Appendix N

Wetland Resource Maps





\\vhb\proj\Bedford\52380.05\GIS\Project\Wetland_Resource_Map.mxd



Sanbornton Bridge #127/099 | Sanbornton, New Hampshire

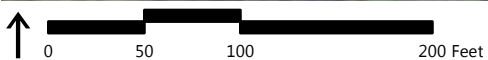
- Project Location
- Delineated Wetland Edge
- Wetland
- Delineated TOB
- Open Water
- Delineated Stream

Wetland Resource Map

Source: NHGRANIT, VHB



\\vhb[proj]Bedford\52380.05\GIS\Project\Wetland_Resource_Map.mxd



Sanbornton Bridge #124/096

Sanbornton, New Hampshire

- Project Location
- Wetland
- Open Water
- Delineated Wetland Edge
- Delineated TOB
- Delineated Stream

Wetland Resource Map

Source:NHGRANIT, VHB

Appendix O

NHDES Watershed Report Card



Welcome to New Hampshire's Watershed Report Cards built from the DRAFT 2014, 305(b)/303(d)

Each Watershed Report Card covers a single 12 digit Hydrologic Unit Code (HUC12), on average a 34 square mile area. Each Watershed Report Card has three components;

1. REPORT CARD - A one page card that summarizes the overall use support for Aquatic Life, Primary Contact (i.e. Swimming), and Secondary Contact (i.e. Boating) Designated Uses on every Assessment Unit ID (AUID) within the HUC12.
2. HUC 12 MAP - A map of the watershed with abbreviated labels for each AUID within the HUC12.
3. ASSESSMENT DETAILS - Anywhere from one to forty pages with the detailed assessment information for each and every AUID in the Report Card and Map.

How are the Surface Water Quality Assessment determinations made?

All readily available data with reliable Quality Assurance/Quality Control is used in the biennial surface water quality assessments. For a full understanding of how the Surface Water Quality Standards (Env-Wq 1700) are translated into surface water quality assessments we urge the reader to review the 2014 Consolidated Assessment and Listing Methodology (CALM) at

<http://des.nh.gov/organization/divisions/water/wmb/swqa/documents/calm.pdf>

Where can I find more advanced mapping resources?

GIS files are available by assessment cycle at <ftp://pubftp.nh.gov/DES/wmb/WaterQuality/SWQA/>

I'd like to see the more raw water quality data?

The web mapping tool allows you to download the data used in the assessment of the primary contact and aquatic life designated uses by clicking on the “**Data Access Waterbody Data (Aquatic Life and Swimming Uses)**” link for any assessment unit. (http://www2.des.state.nh.us/WaterShed_SWQA/SWQA_Map.aspx)

How are assessments coded in the report card?

Assessment outcomes are displayed on a color scale as well as an alpha numeric scale that provides additional distinctions for the designated use and parameter level assessments as outlined in the table below.

		Severe	Poor	Likely Bad	No Data	Likely Good	Marginal	Good
		Not Supporting, Severe	Not Supporting, Marginal	Insufficient Information – Potentially Not Supporting	No Data	Insufficient Information – Potentially Full Supporting	Full Support, Marginal	Full Support, Good
CATEGORY	Description							
*Category 2	Meets standards						2-M or 2-OBS	2-G
Category 3	Insufficient Information			3-PNS	3-ND	3-PAS		
Category 4	Does not Meet Standards;							
4A	TMDL^ Completed	4A-P	4A-M or 4A-T					
4B	Other enforceable measure will correct the issue.	4B-P	4B-M or 4B-T					
4C	Non-pollutant (i.e. exotic weeds)	4C-P	4C-M					
Category 5	TMDL^ Needed	5-P	5-M or 5-T					

* “Category 1” only exists at the Assessment Unit Level.

^ TMDL stands for Total Maximum Daily Load studies (<http://des.nh.gov/organization/divisions/water/wmb/tmdl/index.htm>)

WATERSHED 305(b) ASSESSMENT SUMMARY REPORT:

HUC 12 010700010802

HUC 12 NAME SALMON BROOK

(Locator map on next page only applies to this HUC12)

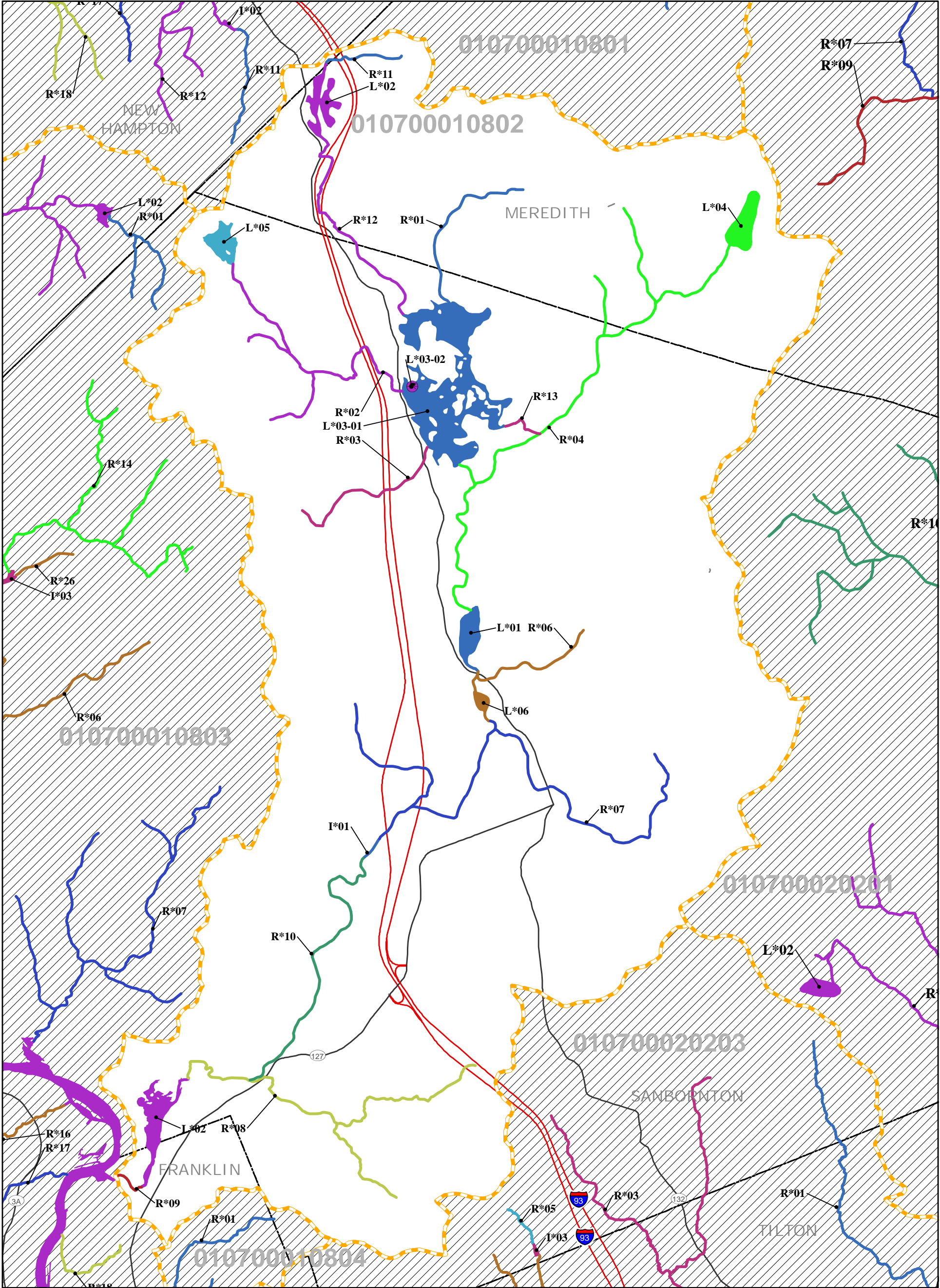
Assessment Cycle 2014 *DRAFT*

Good	Full Support Good
Marginal	Full Support Marginal
Likely Good	Insufficient Information – Potentially Full Support
No Data	No Data
Likely Bad	Insufficient Information – Potentially Not Support
Poor	Not Support Marginal
Severe	Not Support Severe



ASSESSMENT UNIT ID	MAP LABEL	ASSESSMENT UNIT NAME	AQUATIC LIFE	SWIMMING	BOATING	FISH CONSUMP.
NHIMP700010802-01	I*01	SALMON BROOK II DAM	3-ND	3-ND	3-ND	4A-M
NHLAK700010802-01	L*01	CAWLEY POND	3-ND	3-ND	3-ND	4A-M
NHLAK700010802-02	L*02	GILES POND	5-M	3-PAS	3-ND	4A-M
NHLAK700010802-03-01	L*03-01	HERMIT LAKE	4A-M	5-M	2-M	4A-M
NHLAK700010802-03-02	L*03-02	HERMIT LAKE - TOWN BEACH	4A-M	5-M	2-M	4A-M
NHLAK700010802-04	L*04	RANDLETT POND	4A-M	3-PAS	3-ND	4A-M
NHLAK700010802-05	L*05	MOUNTAIN POND	4A-M	3-ND	3-ND	4A-M
NHLAK700010802-06	L*06	ROLLINS POND	3-ND	3-ND	3-ND	4A-M
NHRIV700010802-01	R*01	UNNAMED BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV700010802-02	R*02	HADLEY BROOK	5-M	3-ND	3-ND	4A-M
NHRIV700010802-03	R*03	UNNAMED BROOKS - TO HERMIT LAKE	3-PNS	3-ND	3-ND	4A-M
NHRIV700010802-04	R*04	SALMON BROOK	3-PAS	3-ND	3-ND	4A-M
NHRIV700010802-06	R*06	SALMON BROOK - GILES BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV700010802-07	R*07	SALMON BROOK - EMERSON BROOK	5-M	4A-P	3-ND	4A-M
NHRIV700010802-08	R*08	SALMON BROOK - THRESHING MILL BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV700010802-09	R*09	SALMON BROOK	2-S	3-PAS	3-ND	4A-M
NHRIV700010802-10	R*10	SALMON BROOK	5-P	4A-P	2-S	4A-M
NHRIV700010802-11	R*11	UNNAMED BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV700010802-12	R*12	SALMON BROOK	3-PAS	3-ND	3-ND	4A-M
NHRIV700010802-13	R*13	HERMIT BROOK	3-PAS	2-S	2-S	4A-M

AUIDs For HUC12: 010700010802 - Salmon Brook



HUC12 Boundaries

Town Boundaries

Major Roads

Interstate Highway

US Highway

State Highway

Assessment Unit Coloring

AUs Ending with:

0 =

1 =

2 =

3 =

4 =

5 =

6 =

7 =

8 =

9 =



Abbrev. Label

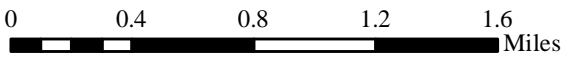
HUC 12

L*03

010700060201

AUID = NH LAK700060201-03

Assessment Unit IDs are derived from the HUC12 they reside within. The labels have been shortened on this map for presentation purposes.
Example: the Label "L*03" in HUC12 = 010700060201 represents AUID = "NHLAK700060201-03"
In rare cases where an AUID extends beyond the boundary of a single HUC12, additional portions of the end of the HUC 12 number have also been replaced.



Scale:1:39,980

Assessment Unit ID NHRIV700010802-07
 Assessment Unit Name SALMON BROOK - EMERSON BROOK
 Primary Town SANBORTON

Size 4.7340 MILES
 Beach N
 Assessment Unit Category*~ 5-M

2014, 305(b)/303(d) - All Reviewed
 Parameters by Assessment Unit
 DRAFT

Designated Use Description	*Desig. Use Category	Desig. Use Threat	Parameter Name	Parameter Threatened (Y/N)	Last Sample	Last Exceed	Parameter Category*	TMDL Priority	Source Name (Impairments only)
Aquatic Life	5-M		Aluminum	N	2006	2006	5-M	LOW	Source Unknown
			Benthic-Macroinvertebrate Bioassessments (Streams)	N			3-ND		
			Dissolved oxygen saturation	N	2006	NA	3-ND		
			Fishes Bioassessments (Streams)	N			3-ND		
			Oxygen, Dissolved	N	2006	NA	3-ND		
			pH	N	2006	NA	3-ND		
Drinking Water After Adequate Treatment	2-G								
Fish Consumption	4A-M		Mercury	N			4A-M		Atmospheric Deposition - Toxics
Primary Contact Recreation	4A-P		Escherichia coli	N	2006	2006	4A-P		Source Unknown
Secondary Contact Recreation	3-ND		Escherichia coli	N	2006	NA	3-ND		
Wildlife	3-ND								

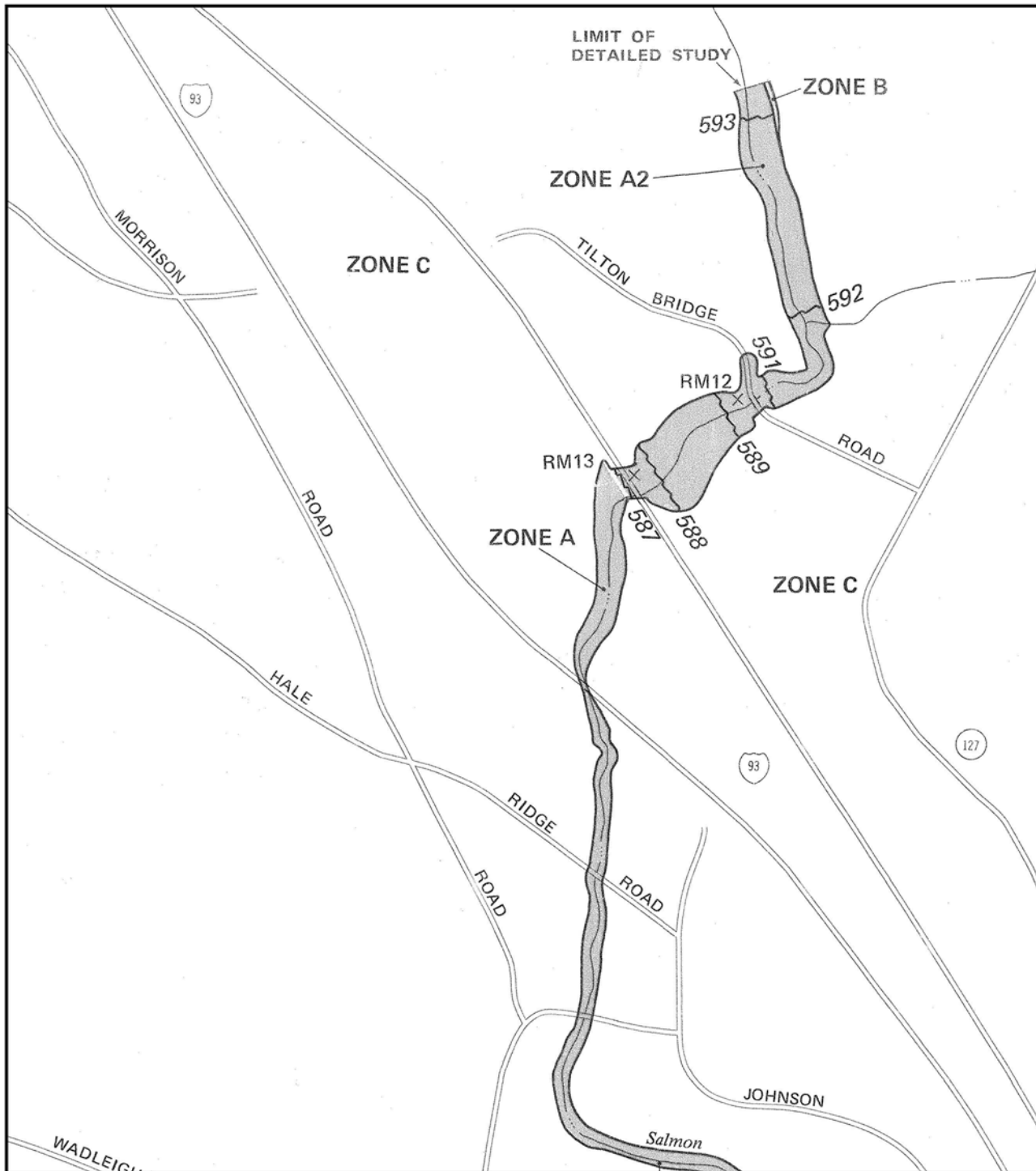
Severe Not Supporting, Severe	Poor Not Supporting, Marginal	Likely Bad Insufficient Information - Potentially Full Supporting	No Data No Data	Likely Good Insufficient Information - Potentially Full Supporting	Marginal Full Support, Marginal	Good Full Support, Good
---	---	---	---------------------------	--	---	-----------------------------------

*DES Categories; 2-G = Supports Parameter well above criteria, 2-M = Supports Parameter marginally above criteria, 2-OBS = Exceeds WQ criteria but natural therefore not a WQ exceedence, 3-ND = Insufficient Information/No data, 3-PAS= Insufficient Information/Potentially Attaining Standard, 3-PNS= Insufficient Information/Potentially Not Attaining Standard, (4A=Impaired/TMDL Completed, 4B=Impaired/Other Measure will rectify Impairment, 4C=Impaired/Non-Pollutant, 5=Impaired/TMDL needed) M=Marginal Impairment, P=Severe Impairment, T=Threatened (<http://des.nh.gov/organization/divisions/water/wmb/swqa/index.htm>)

Appendix P

FEMA Floodplain Map





APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
SANBORNTON,
NEW HAMPSHIRE
BELKNAP COUNTY

PANEL 15 OF 20
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
330008 0015 B

EFFECTIVE DATE:
JUNE 15, 1979



U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

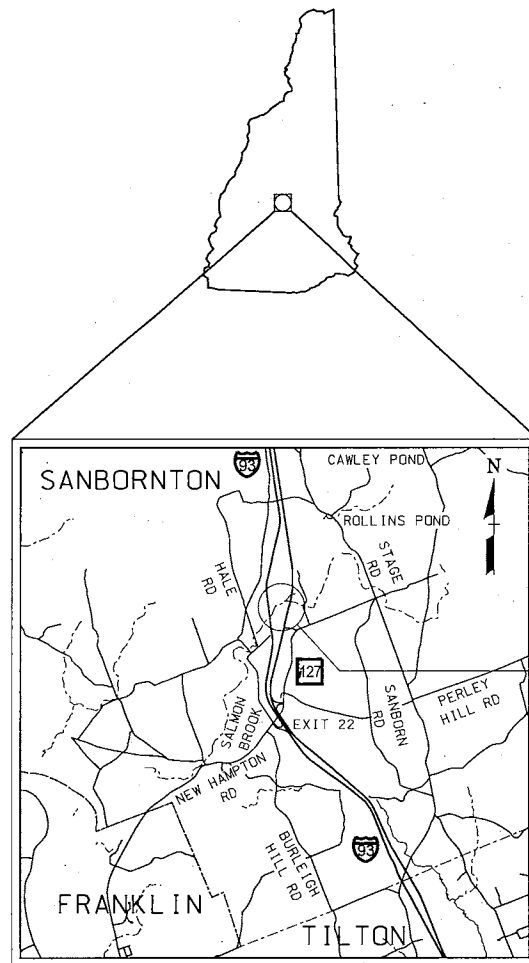
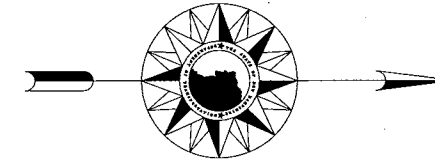
Appendix Q

Wetland Impact Plans



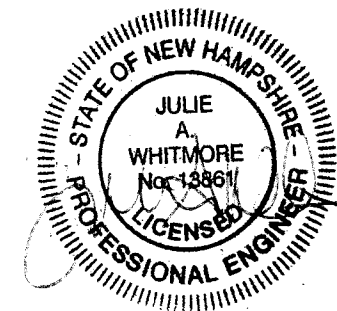
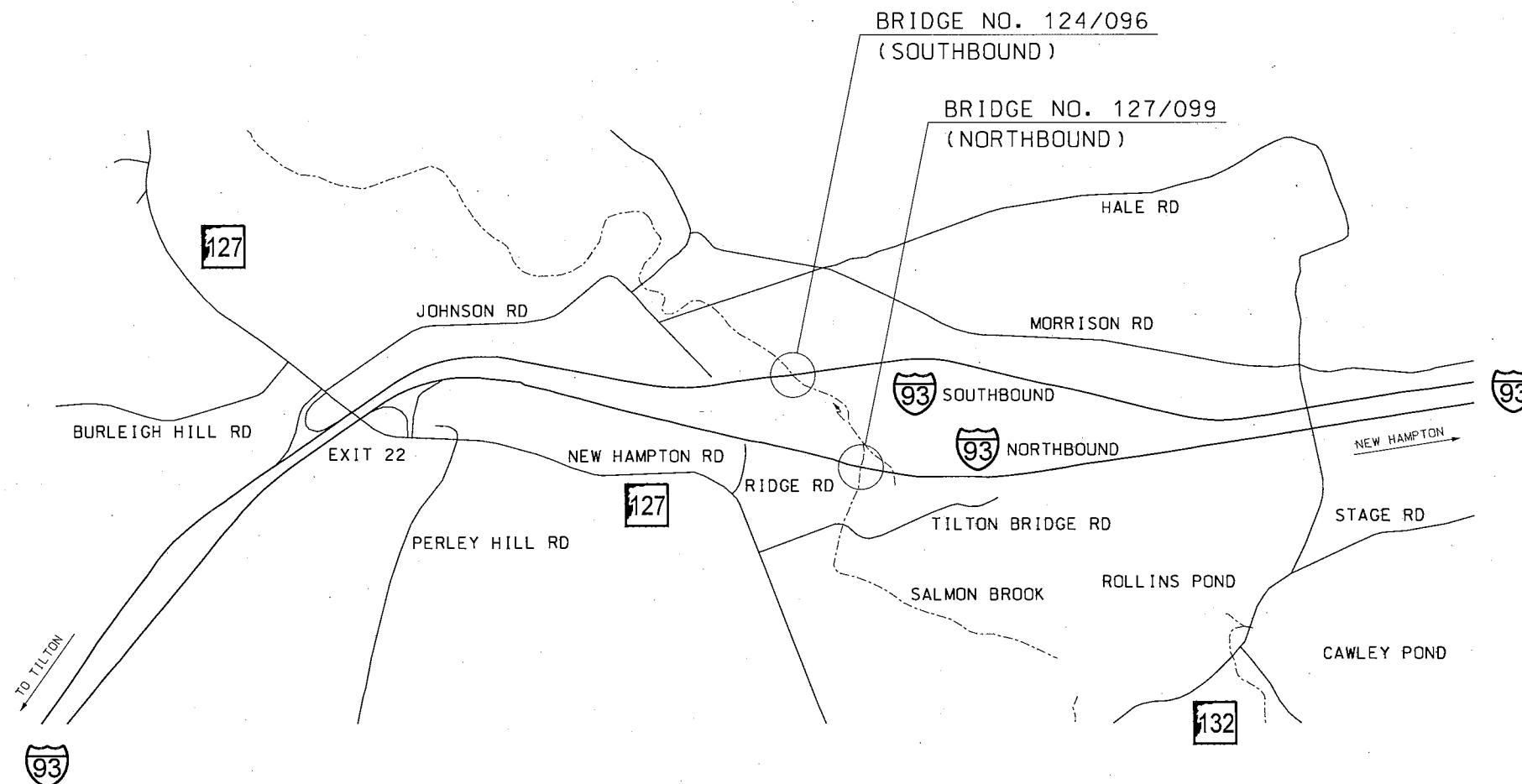
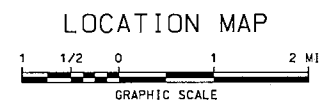
STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION WETLAND PLANS

NH PROJECT NO. 16154
I-93 NB AND SB OVER SALMON BROOK



STATE PROJECT 16154

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2-3	STANDARD SYMBOLS
4	EROSION CONTROL STRATEGIES
5-7	ACCESS AND EROSION CONTROL PLANS
8	WETLAND IMPACT SUMMARY



DRAWN BY KDW DATE 6/29/2017
CHECKED BY KCD DATE 6/29/2017

TOWN OF SANBORNTON
COUNTY OF BELKNAP
SCALE: 1"= 1000'



NH DOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION			
FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
X-A001(158)	16154	1	8

GENERAL

EDGE OF PAVEMENT
TRAVELED WAY

PROPOSED ROADWAY

existing roadway

(pavement removed outside slope lines)

DRIVEWAYS

(label surface type)

BUILDINGS

(label house or type of building)

FOUNDATION

(label type)

LEACH FIELD

leach field

BRIDGE CROSSINGS

STREAM

OVERPASS

STEPS AND WALK

(label type)

INTERMITTENT WATER COURSE

SHORE LINE

river/stream

pond (label name of water body)

POTENTIAL WET AREA SYMBOL

BRUSH OR WOODS LINE

TREES (PLANS)

(deciduous) (coniferous) (stump)

TREE OR STUMP (CROSS-SECTIONS)

(show station, circumference in feet & type)

HEDGE

(label type)

MONITORING WELL

mon

WELL

W

FLAG POLE

fp

ORIGINAL GROUND (TYPICALS)

ROCK OUTCROP

ROCK LINE (TYPICALS & SECTIONS ONLY)

GUARDRAIL (label type)

JERSEY BARRIER

CURB (LABEL TYPE)

STONE WALL

RETAINING WALL (LABEL TYPE)

FENCE (LABEL TYPE)

SIGNS

(single post)

(double post)

GAS PUMP

FUEL TANK (ABOVE GROUND)

STORAGE TANK FILLER CAP

SEPTIC TANK

GRAVE

MAILBOX

VENT PIPE

SATELLITE DISH ANTENNA

PHONE

GROUND LIGHT/LAMP POST

BORING LOCATION

TEST PIT

INTERSTATE NUMBERED HIGHWAY

UNITED STATES NUMBERED HIGHWAY

STATE NUMBERED HIGHWAY

SHORELAND - WETLAND

WETLAND DESIGNATION AND TYPE

DELINEATED WETLAND

ORDINARY HIGH WATER

TOP OF BANK

TOP OF BANK & ORDINARY HIGH WATER

NORMAL HIGH WATER

WIDTH AT BANK FULL

PRIME WETLAND

PRIME WETLAND 100' BUFFER

NON-JURISDICTIONAL DRAINAGE AREA

COWARDIN DISTINCTION LINE

TIDAL BUFFER ZONE

DEVELOPED TIDAL BUFFER ZONE

HIGHEST OBSERVABLE TIDE LINE

MEAN HIGH WATER

MEAN LOW WATER

VERNAL POOL

SPECIAL AQUATIC SITE

REFERENCE LINE

WATER FRONT BUFFER

NATURAL WOODLAND BUFFER

PROTECTED SHORELAND

INVASIVE SPECIES LABEL

INVASIVE SPECIES

FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY

100 YEAR FLOODPLAIN BOUNDARY

FLOODWAY

ENGINEERING

CONSTRUCTION BASELINE

PC, PT, POT (ON CONST BASELINE)

PI (IN CONSTRUCTION BASELINES)

INTERSECTION OR EQUATION OF TWO LINES

ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)

PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)

CLEARING LINE

SLOPE LINE

SLOPE LINE (FILL)

SLOPE LINE (CUT)

PROFILES AND CROSS SECTIONS:

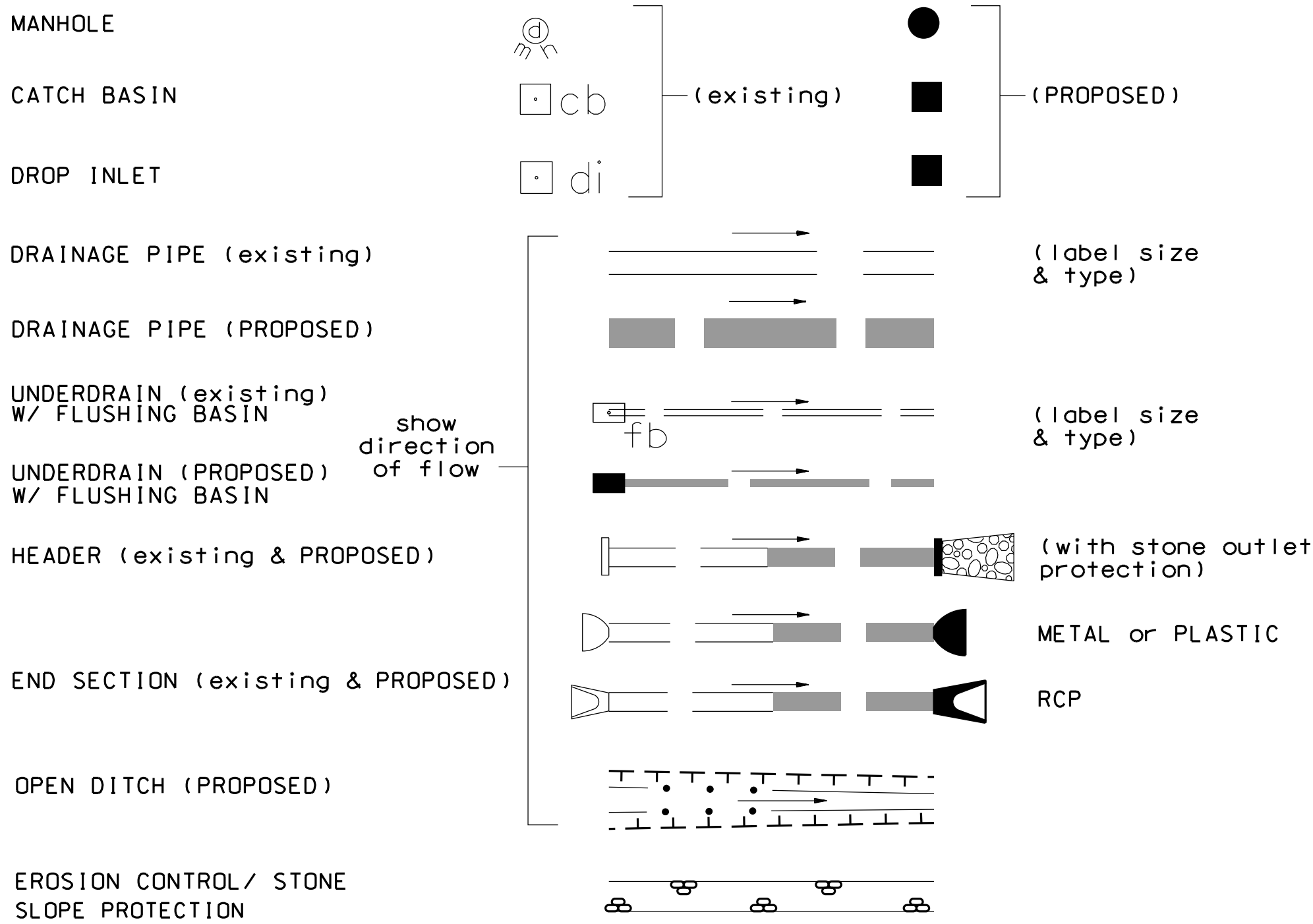
ORIGINAL GROUND ELEVATION (LEFT)

FINISHED GRADE ELEVATION (RIGHT)

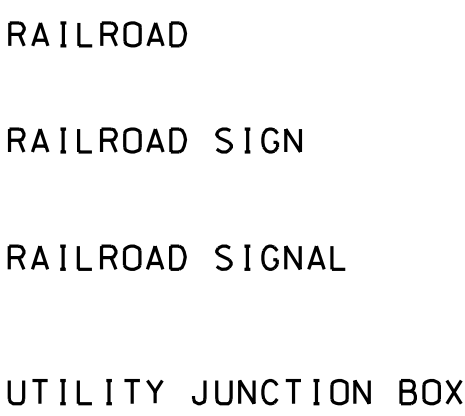
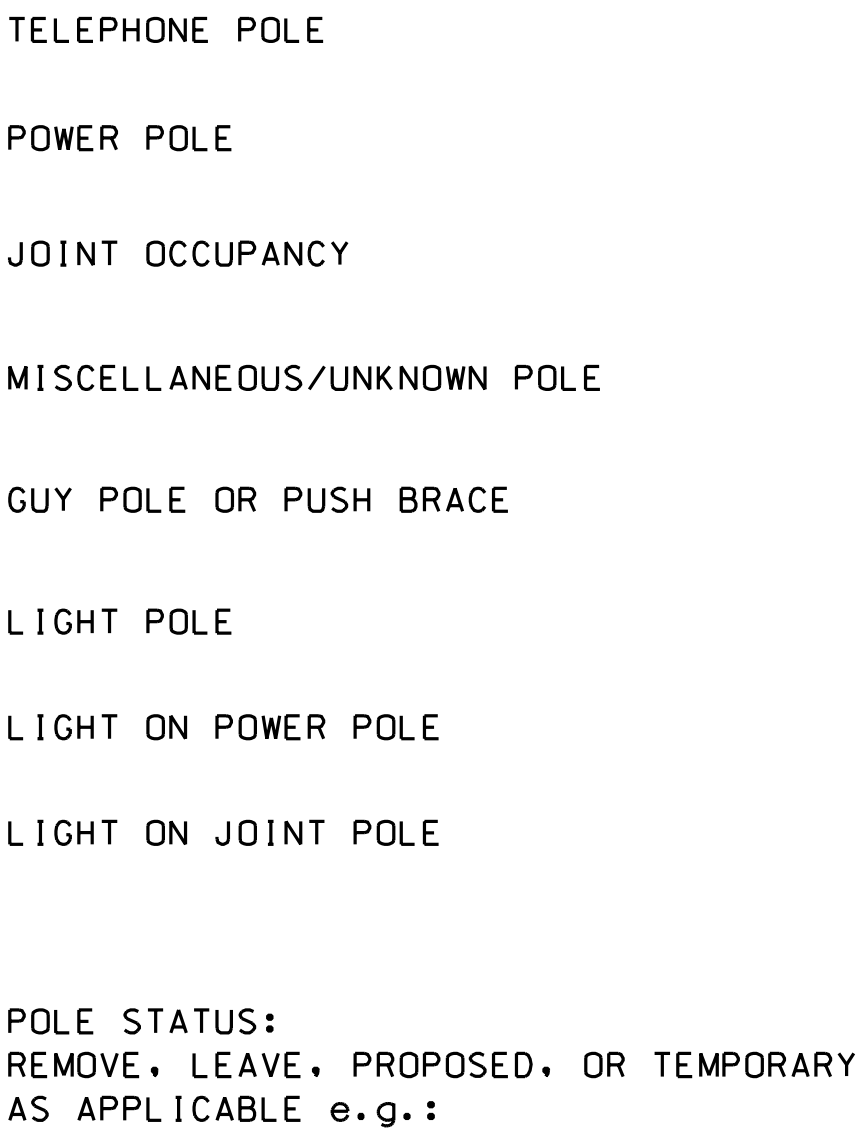
SHEET 1 OF 2

STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
STANDARD SYMBOLS				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	STDSym.dgn	16154	2	8

DRAINAGE



BOUNDARIES / RIGHT-OF-WAY



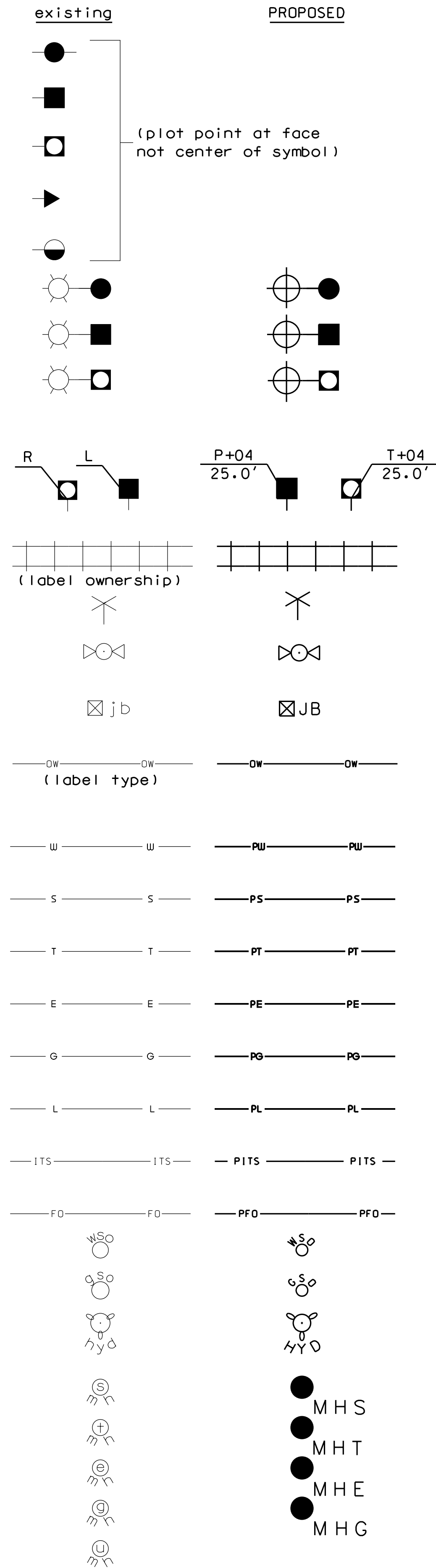
UNDERGROUND UTILITIES



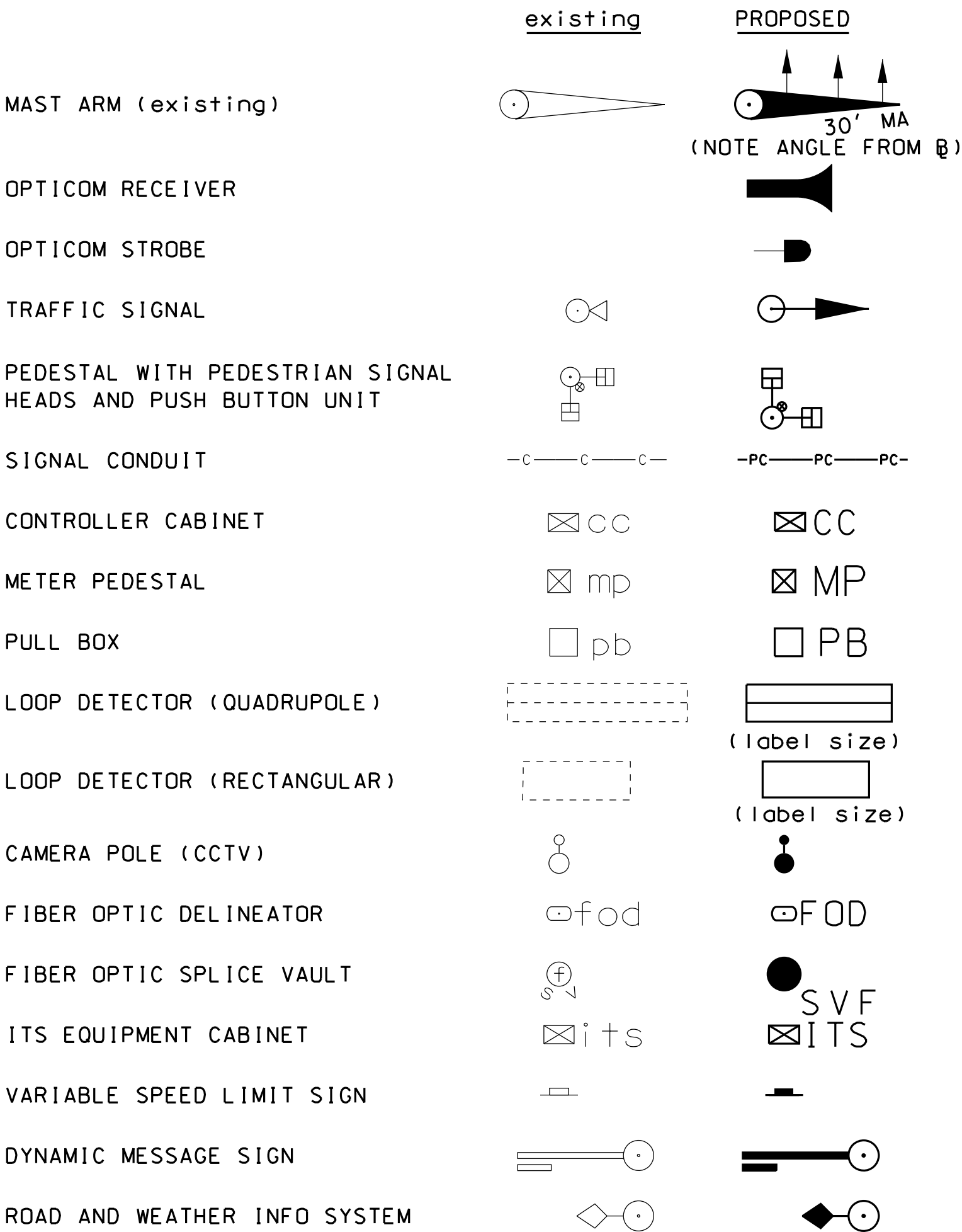
MANHOLES



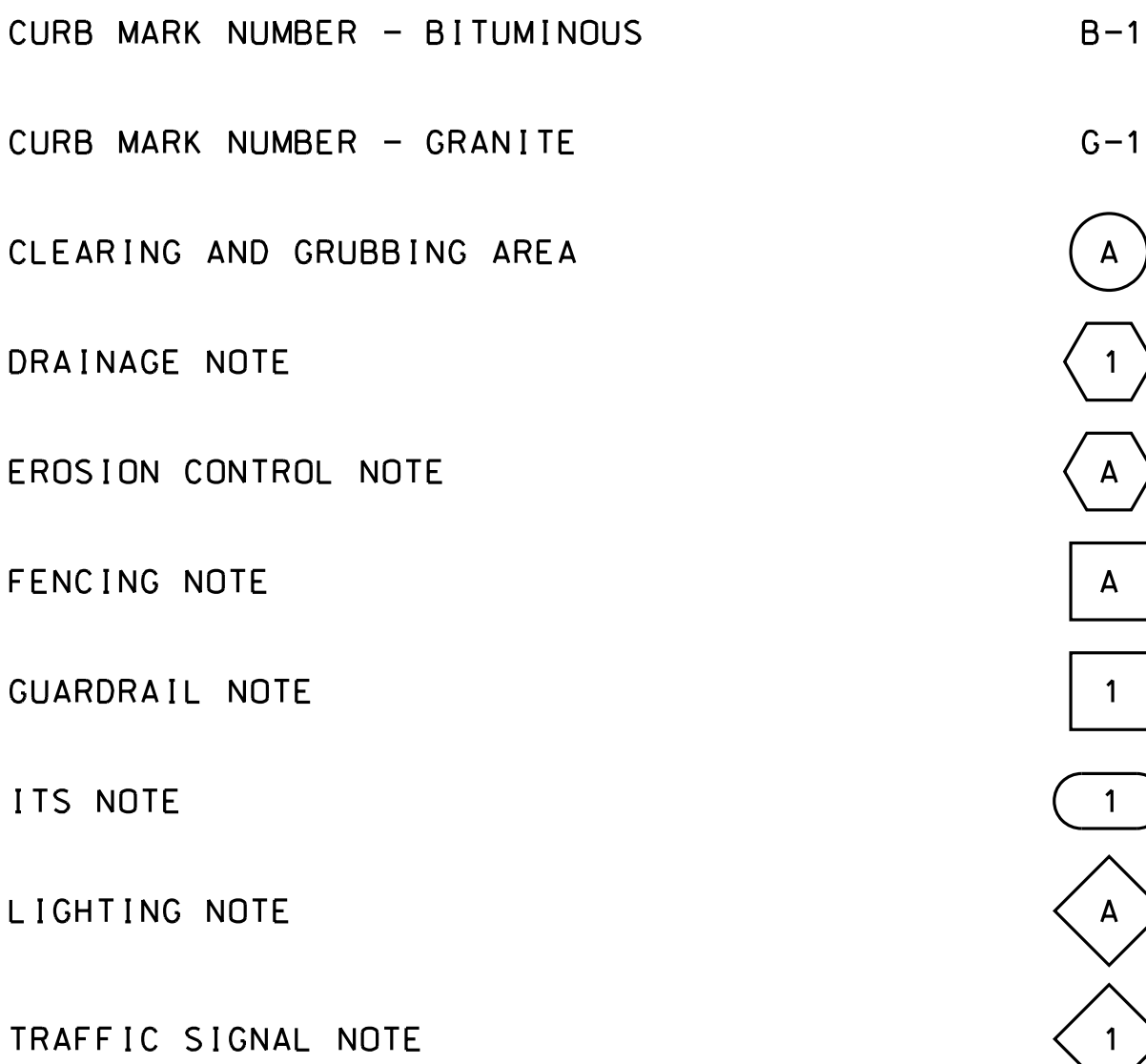
UTILITIES



TRAFFIC SIGNALS / ITS

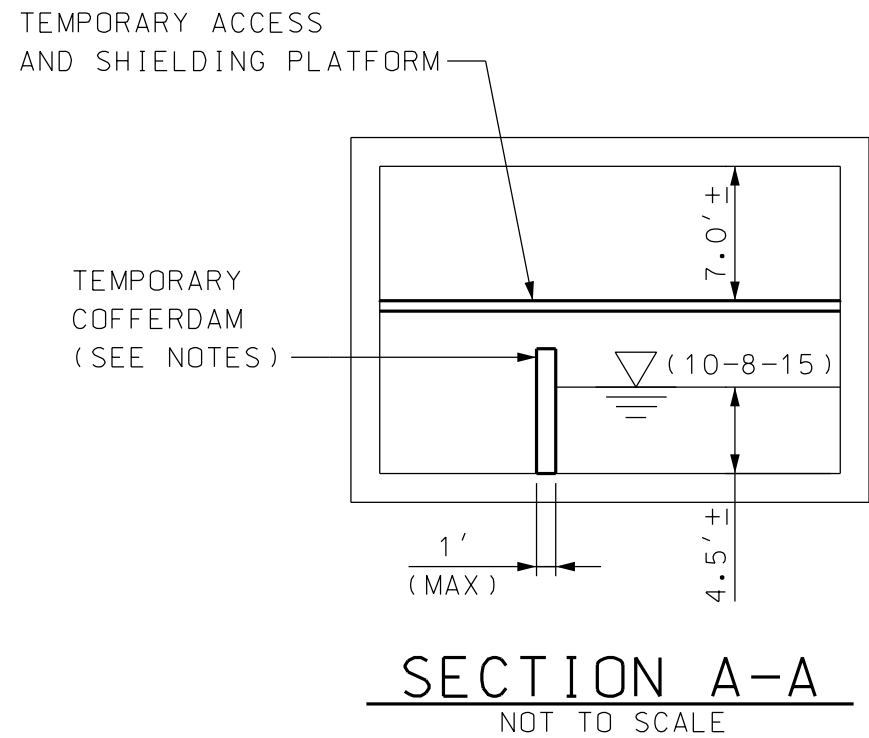


CONSTRUCTION NOTES



SHEET 2 OF 2

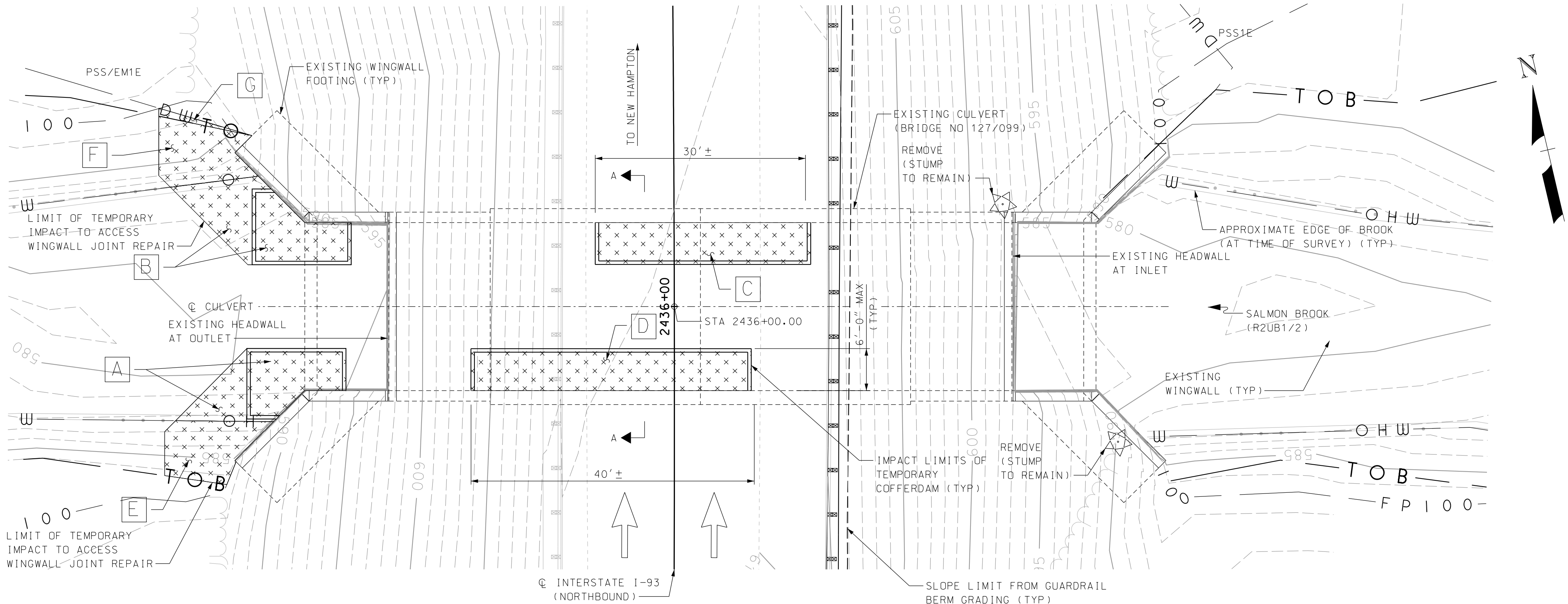
STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
STANDARD SYMBOLS				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
9-1-2016	STDSym.dgn	16154	3	8



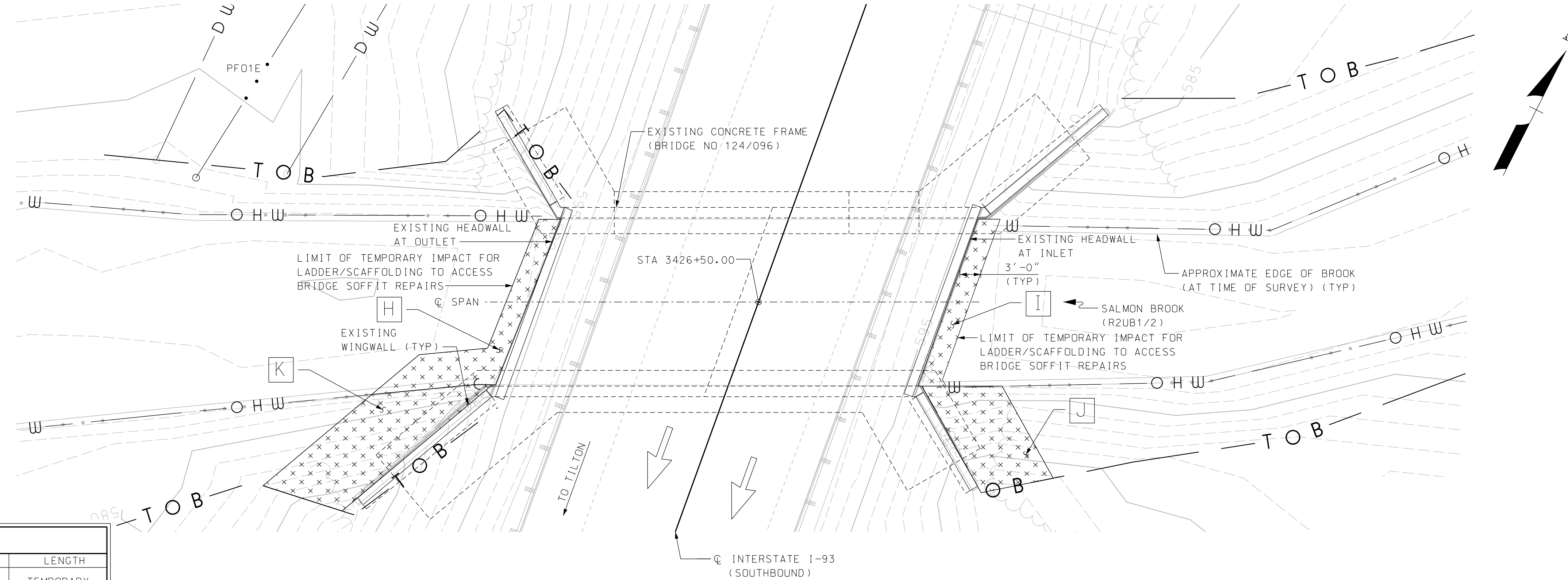
NOTES

1. STREAM TOP OF BANK AND WETLANDS DELINEATED BY VHB WETLAND SCIENTIST, KRISTOPHER WILKES (CWS #288) ON NOVEMBER 13, 2015 IN ACCORDANCE WITH THE ENV-WT 101-07 AND RSA 483-B:4 (XI-e). PRIME WETLANDS ARE NOT LOCATED WITHIN THE VICINITY OF THE PROJECT.
2. 100-YEAR FLOODPLAIN FOR BRIDGE NO. 127/099 (NORTHBOUND BRIDGE) IS BASED ON INFORMATION PROVIDED IN 1978 EFFECTIVE FLOOD INSURANCE STUDY. ELEVATIONS RANGE FROM APPROXIMATELY 586.6 UPSTREAM TO APPROXIMATELY 586.3 DOWNSTREAM. NO INFORMATION IS AVAILABLE FOR BRIDGE NO. 124/096 (SOUTHBOUND BRIDGE).
3. THE PROPOSED WORK IS LIMITED TO REPAIR OF CONCRETE SURFACES INCLUDING CRACKS AND SPALL REPAIRS AND REPLACEMENT OF APPROXIMATELY 800 FEET OF GUARDRAIL. THE WORK WILL NOT INVOLVE GRADING OR CHANGES TO BRIDGE DIMENSIONS; THERE SHALL BE NO PERMANENT IMPACTS TO WETLANDS OR SALMON BROOK (BED OR BANKS).
4. TEMPORARY IMPACTS AT BRIDGE 127/099 (NORTHBOUND) ARE LIMITED TO PLACEMENT OF STAGED TEMPORARY COFFERDAMS TO ALLOW ACCESS TO PORTIONS OF THE BRIDGE BELOW ORDINARY HIGH WATER TO COMPLETE CONCRETE REPAIRS.
5. AT BRIDGE NO. 127/099 (NORTHBOUND), COFFERDAMS ON NORTH AND SOUTH SIDES SHALL NOT BE INSTALLED SIMULTANEOUSLY. THE COFFERDAMS SHALL BE LIMITED TO ONE SIDE AT A TIME TO MAXIMIZE CHANNEL FLOW AREA.
6. TEMPORARY BED IMPACTS FOR COFFERDAM AND ACCESS ARE NOT ANTICIPATED TO RESULT IN SEDIMENTATION WITHIN THE WATERWAY. HOWEVER, THE CONTRACTOR SHOULD EVALUATE THE POTENTIAL FOR SEDIMENTATION PRIOR TO INSTALLATION AND PLACE TURBIDITY CURTAIN(S) AROUND THE IMPACT AREAS, IF REQUIRED.
7. COFFERDAMS MAY BE DEWATERED BY PUMPING DIRECTLY INTO SALMON BROOK IF NOT TURBID. OTHERWISE, THE WATER SHALL BE TREATED OR DIVERTED TO CONTAINERS AND HAULED OFF-SITE FOR PROPER DISPOSAL.
8. SCAFFOLDING WORK SURFACES SHALL BE PLACED ABOVE WATER SURFACE WHEN CONDUCTING REPAIRS TO ROOF SLAB AND UPPER WALLS TO ELIMINATE RISK TO WATER QUALITY.
9. TEMPORARY IMPACTS AT BRIDGE 124/096 (SOUTHBOUND) ARE LIMITED TO THOSE NEEDED TO INSTALL LADDERS AND/OR TEMPORARY SCAFFOLD TO REPAIR SOFFITS AT THE BRIDGE ENDS. NO STRUCTURES SHALL BE PLACED THAT WILL IMPEDE CHANNEL FLOW. COFFERDAMS ARE NOT REQUIRED TO COMPLETE REPAIRS AT BRIDGE 124/096.

WETLAND IMPACT SUMMARY				
WETLAND	WETLAND CLASSIFICATION	LOCATION	AREA	LENGTH
			TEMPORARY IMPACTS	TEMPORARY IMPACTS
			SF	LF
SALMON BROOK	R2UB1/2	A	166	25
SALMON BROOK	R2UB1/2	B	190	25
SALMON BROOK	R2UB1/2	C	184	30
SALMON BROOK	R2UB1/2	D	240	40
SALMON BROOK	BANK	E	100	15
SALMON BROOK	BANK	F	102	14
	PSS/EM1E	G	8	
SALMON BROOK	R2UB1/2	H	140	25
SALMON BROOK	R2UB1/2	I	77	25
SALMON BROOK	BANK	J	163	18
SALMON BROOK	BANK	K	245	33
TOTAL			1615	250



BRIDGE NO. 127/099 PLAN



BRIDGE NO. 124/096 PLAN

LEGEND

- [X] = WETLAND IMPACT LOCATION
- [X X X] = TEMPORARY IMPACT
- R2UB1/2 = RIVERINE LOWER PERRENIAL UNCONSOLIDATED BOTTOM COBBLE - GRAVEL/SAND
- PF01E = PALUSTRINE FORESTED BROAD-LEAVED DECIDUOUS SEASONALLY FLOODED/SATURATED
- PSS1E = PALUSTRINE SCRUB-SHRUB BROAD-LEAVED DECIDUOUS SEASONALLY FLOODED/SATURATED
- PSS/EM1E = PALUSTRINE SCRUB-SHRUB BROAD-LEAVED DECIDUOUS/PALUSTRINE EMERGENT PERSISTENT SEASONALLY FLOODED/SATURATED



PLOT DATE	DRAWING NAME	SHEET SCALE
6/29/2017	Wet_WetImp.dgn	AS NOTED

STATE OF NEW HAMPSHIRE											
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN											
TOWN SANBORNTON			BRIDGE NO. 127/099				STATE PROJECT 16154				
LOCATION I-93 OVER SALMON BROOK											
WETLAND IMPACT SUMMARY								BRIDGE SHEET			
REVISIONS AFTER PROPOSAL			BY			DATE		BY		DATE	
			DESIGNED			JAW 06/17		CHECKED		SMH 06/17	
			DRAWN			JAR 06/17		CHECKED		JAR 06/17	
			QUANTITIES				CHECKED				
			ISSUE DATE			FEDERAL PROJECT NO.			SHEET NO.		TOTAL SHEETS
			REV. DATE						8		8



Appendix R

Access and Erosion Control Plans



EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:

1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.

1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA’S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).

1.3. THE CONTRACTOR’S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT, THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.

1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).

1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WQ 1500 REQUIREMENTS (HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM)

1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.
2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:

2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.

2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.

2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.

2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:

(A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;

(B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;

(C) A MINIMUM OF 3” OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;

(D) TEMPORARY SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED

2.5. ALL STOCKPILES SHALL BE CONTAINED WITH A PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.

2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.

2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.

2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30th AND MAY 1st OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.

(A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15th, OR WHICH ARE DISTURBED AFTER OCTOBER 15th, SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.

(B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15th, OR WHICH ARE DISTURBED AFTER OCTOBER 15th, SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.

(C) AFTER NOVEMBER 30th INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.

(D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER CONSTRUCTION PLAN HAS BEEN APPROVED BY NHDOT THAT MEETS THE REQUIREMENTS OF ENV-WQ 1505.02 AND ENV-WQ 1505.05.

(E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WQ 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30th.

GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS

3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:

3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.

3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.

3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.

3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.

3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.

4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:

4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.

4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.

4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1st THROUGH NOVEMBER 30th, OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.

5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:

5.1. DIVERT OFF SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON SITE.

5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS, SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.

5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.

5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.

5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS, VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.

6. PROTECT SLOPES:

6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.

6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.

6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.

6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.

7. ESTABLISH STABILIZED CONSTRUCTION EXITS:

7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.

7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.

8. PROTECT STORM DRAIN INLETS:

8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.

8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.

8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.

8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.

9. SOIL STABILIZATION:

9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.

9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)

9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15, OF ANY GIVEN YEAR, IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.

9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER’S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.

10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:

10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WQ 1506.10) SHALL BE SIZED TO RETAIN, ON SITE, THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER. TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.

10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.

10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:

11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.

11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.

11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.

11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.

11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.

11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.

11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.

11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.

11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:

12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500: ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.

12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.

12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.

12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.

12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%, THE DEPARTMENT WILL CONSIDER USING EROSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.

12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.

12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.
13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:

13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.

13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.

13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRIXES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.

13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.
14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:

14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.

14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1, IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.

14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WQ 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

TABLE 1
GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

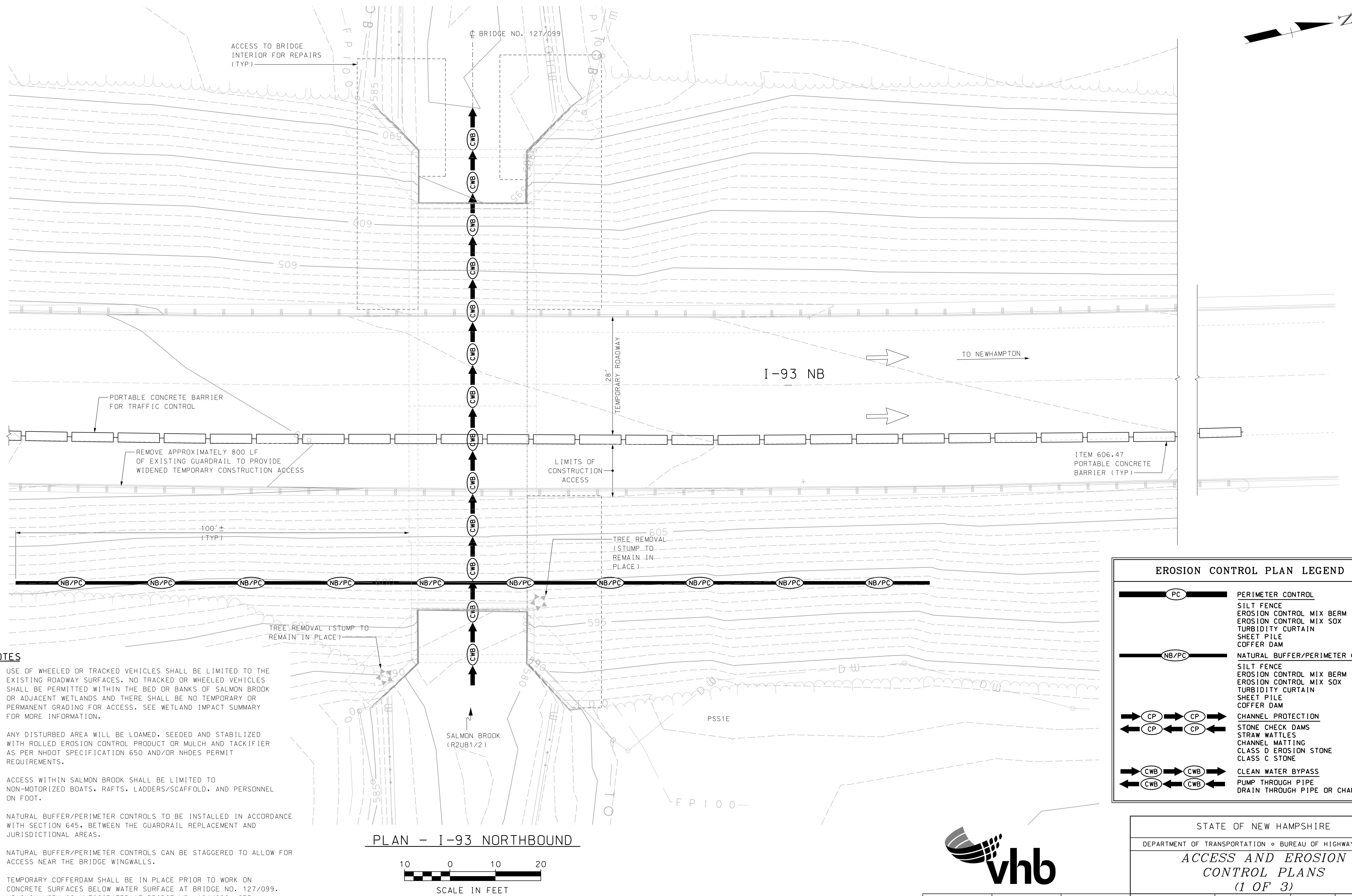
APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES ²				ROLLED EROSION CONTROL BLANKETS ³			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES ¹												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES ¹	YES ¹	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNSB	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNSCB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

- NOTES:
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH ≤10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.

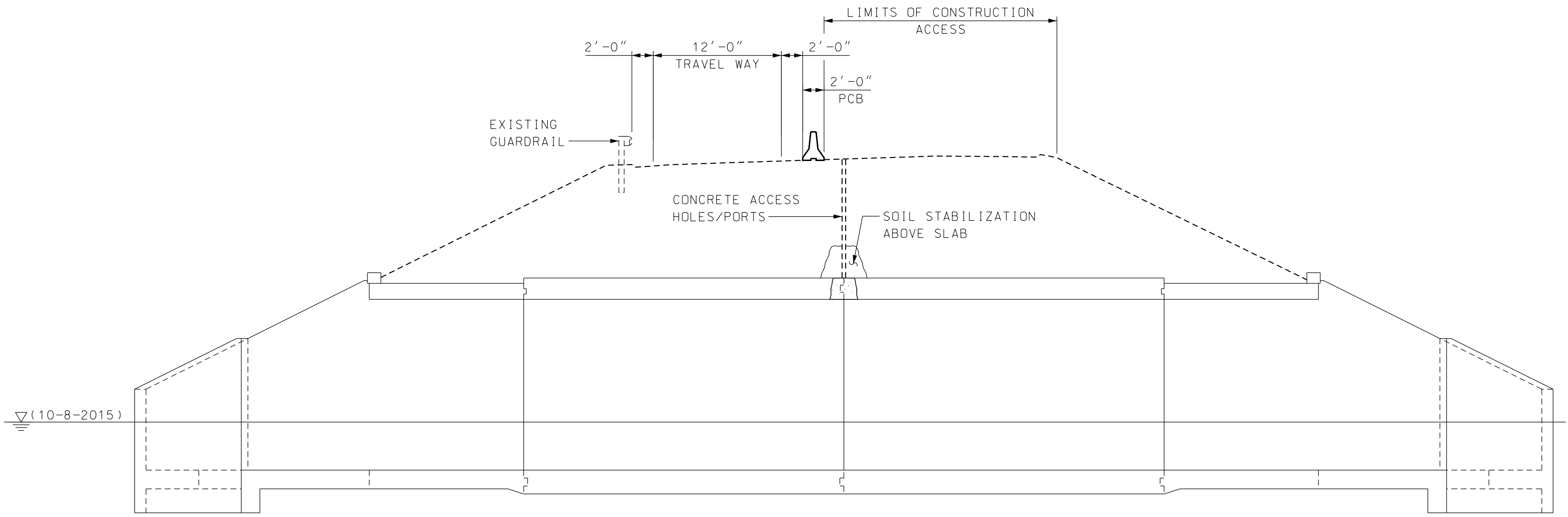
STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
EROSION CONTROL STRATEGIES				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
2-2017, VHB REVISION TO SHEET NAME	EroStrat.dgn	16154	4	8

SDR PROCESSED	KDW	DATE	06/17	REVISIONS AFTER PROPOSAL			
NEW DESIGN	KCD	DATE	06/17	NUMBER	DATE	STATION	DESCRIPTION
SHEET CHECKED	SMH	DATE	06/17				
AS BUILT DETAILS							
		DATE					

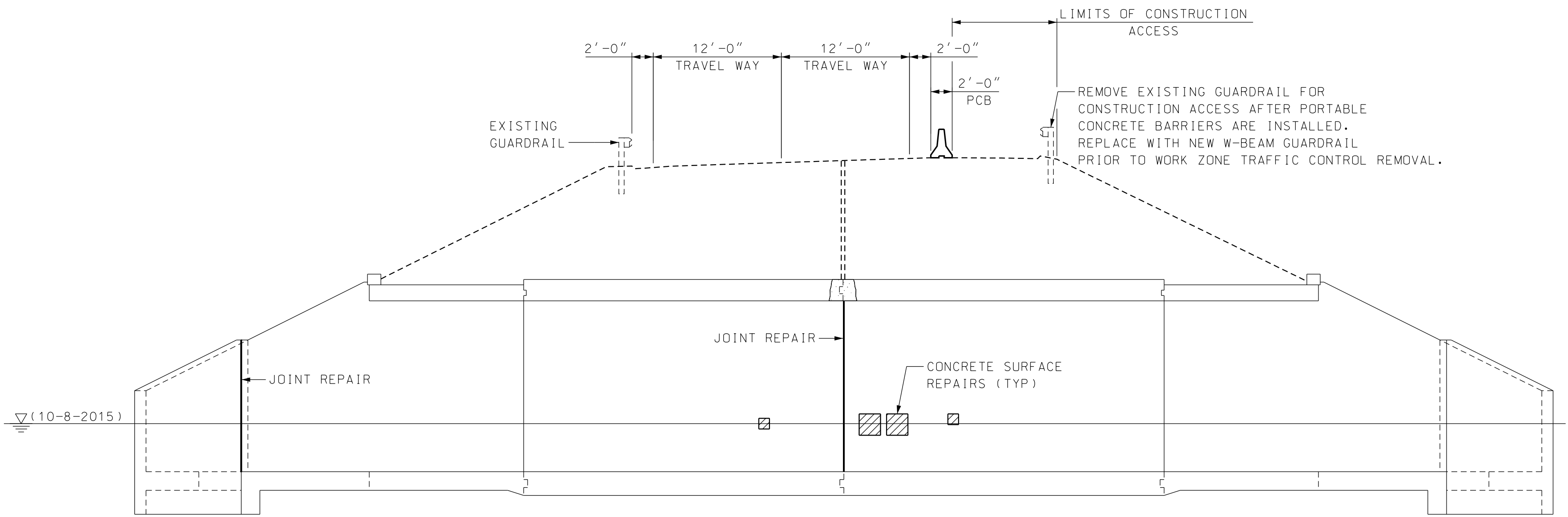


DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
6/29/2017	52380.05	---	16154nb_+cp03.dgn	16154	5	8

SDR PROCESSED		KDW	DATE		REVISIONS AFTER PROPOSAL	
			NEW DESIGN	KCD	STATION	DESCRIPTION
SHEET CHECKED		SMH	DATE	06/17		
AS BUILT DETAILS			DATE			



TEMPORARY LANE CLOSURE AND TRAFFIC SHIFT
FOR CENTER JOINT STABILIZATION AND REPAIR
(LOOKING NORTH)
SCALE: 1/8" = 1'-0"



TEMPORARY TRAFFIC SHIFT
FOR CONSTRUCTION ACCESS
(LOOKING NORTH)
SCALE: 1/8" = 1'-0"

I-93 NORTHBOUND BRIDGE NO. 127/099

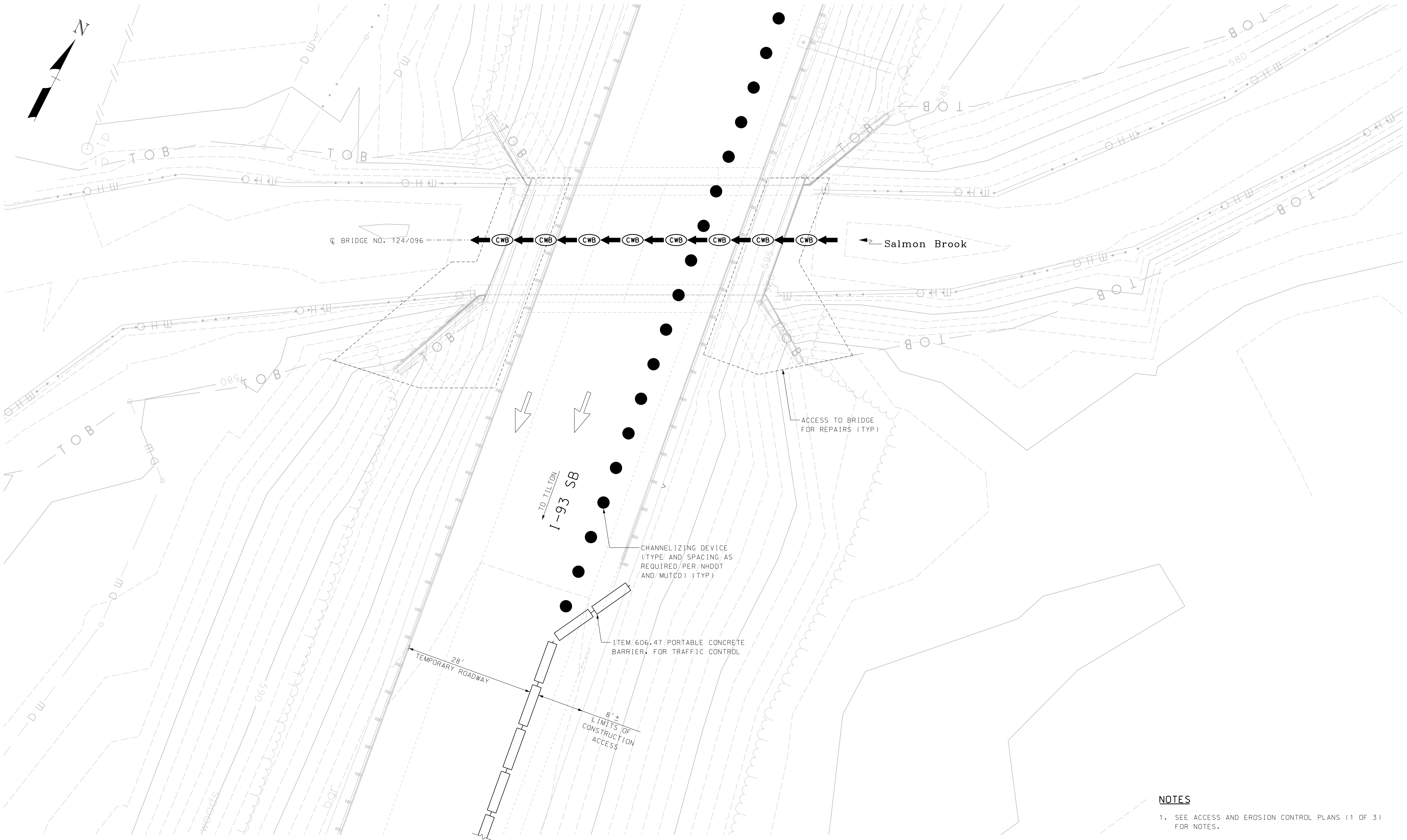


DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
6/29/2017	52380.05	---	16154nb_al+11.phas.dgn	16154	6	8

STATE OF NEW HAMPSHIRE	
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN	
<i>ACCESS AND EROSION CONTROL PLANS (2 OF 3)</i>	

\\nh-bcd\projects\52380.05\cad\plans\er\WetlandPlans\16154sb_gp.dgn

SDR PROCESSED	KDW	REVISIONS AFTER PROPOSAL			
		NUMBER	DATE	STATION	DESCRIPTION
NEW DESIGN	KCD		DATE 06/17		
SHEET CHECKED	SMH		DATE 06/17		
AS BUILT DETAILS			DATE		



NOTES

1. SEE ACCESS AND EROSION CONTROL PLANS (1 OF 3) FOR NOTES.



DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
6/29/2017	52380.05	---	16154sb_gp.dgn	16154	7	8

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN
ACCESS AND EROSION CONTROL PLANS (3 OF 3)